LIVES
OF
GAME ANIMALS

PLATE VIII.—COUGAR FAMILY, FROM LIFE
By Ernest Thompson Seton. Toronto Zoo, 1885

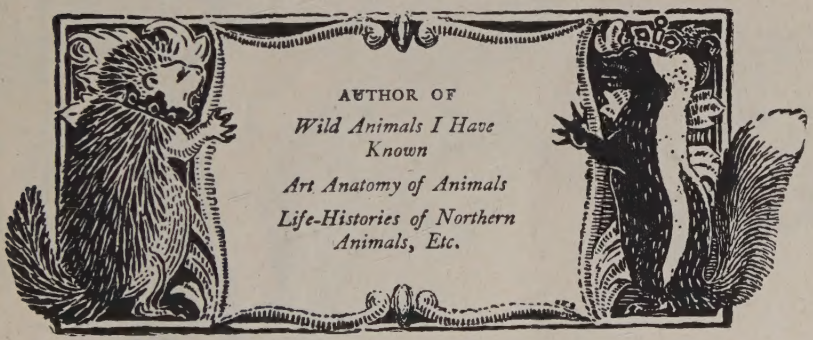
LIVES
OF
GAME ANIMALS

An Account of those Land Animals in America, north of the Mexican Border, which are considered "Game," either because they have held the Attention of Sportsmen, or received the Protection of Law.

BY

ERNEST THOMPSON SETON

FELLOW NEW YORK ZOOLOGICAL SOCIETY
MEMBER NAT. INST. ARTS AND LETTERS



WITH 50 MAPS AND 1500 ILLUSTRATIONS
BY THE AUTHOR

VOLUME I
CATS, WOLVES, AND FOXES

GARDEN CITY NEW YORK
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THE THOUGHT

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The Lynx, the Gray-wolf, the Arctic Wolf.—E. A. Preble, of the Biological Survey.

The Bobcat.—Dr. Hartley H. T. Jackson, of the Biological Survey.

The Coyote.—Dr. W. B. Bell, of the Biological Survey.

The Desert Coyote.—Vernon Bailey, of the Biological Survey, and Prof. Charles T. Vorhies, of Tucson, Ariz.

The Red-fox.—George L. Fordyce, of Youngstown, Ohio.

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PREFACE

THERE was once a great mosaic, constructed of precious stones, jewels, and gold, exquisite in workmanship, full of history, and setting forth the laws of life, well-being, and joy.

That mosaic was broken, scattered, and lost. No one knows exactly what it was like. But wonderful morsels are picked up from time to time in the dustbins, in the woods, on the highway, in the dens of animals, in the minds of men, in the dreams of children.

To a student who saw certain of these gleams of colour—hints of wonder—there came in some sort a vision of the lost masterpiece, and he set about piecing together such broken bits as he could find. Vast gaps there were; but by patient toil he assembled enough to reveal a little of the glorious thing a-coming, and the glimpse that the restoration gave afforded him exquisite happiness. In the very doing of it he found an ample reward.

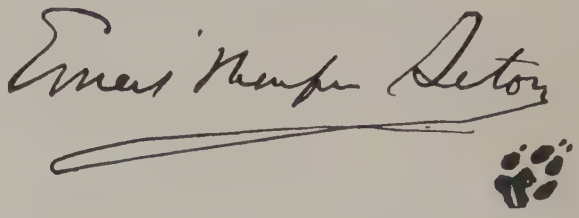
Fellow woodmen! May I claim to be that student? The life of each of my animals is a part of the great mosaic. The scraps I have gathered in the woods, in the records of the great museums, in the journals of naturalists, in the tales of guides and hunters. Much trash and tailings galore I found; but every little while my rake turned up a flake of gold, a bright little bit of enamel—a precious fact, a thing with the stamp of the Master.

And this test I could always apply in assembling the fragments: if they are put together aright, they fit perfectly and need no tooling; a little clearing of mud, perhaps, but no filing, no reshaping. Such tampering could work nothing but ruin. When they are right, they fit.

Many gaps there are and always will be, but sections of the wonder are coming to view.

These Hundred Lives, then, are my attempt at fitting the parts of the mosaic that have come to hand. They will, I hope, prove a starting point for other workers in the field; those with larger gifts and opportunity. At any rate, I have had the joy of making the attempt.

I have finished my work. Let me add a word. I do not consider that I am offering even a fragmentary presentation of the final truth that is coming. This I feel—that I am merely assembling tools, and some day a great man will come, and with these tools construct a telescope that shall surely reveal to us the vision that the world is awaiting.



THE SCOPE

—

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CATS, WOLVES, AND FOXES

VOLUME II

BEARS, RACCOONS, BADGER, AND WEASELS

VOLUME III

DEER, ANTELOPE, BUFFALO, SHEEP, AND PECCARY

VOLUME IV

SQUIRRELS, RABBITS, ARMADILLO, AND OPOSSUM

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MAP I. FAUNAL AREAS OF NORTH AMERICA EXCLUSIVE OF THE TROPICS

The Divisions on Map I may be set forth thus:

Arctic Region divided into:

Faunas

- Greenland
- Alaskan
- Barren-ground
- Alpine
- Aleutian

Temperate Region divided into:

Faunas

- Hudsonian
  - Subalpine subfauna
  - Yukon subfauna
  - Hudsonian subfauna
  - Labrador subfauna
  - Newfoundland subfauna
- Canadian
  - Canadian subfauna
  - Rocky Mountain subfauna

  } Boreal Zone

- Sitkan
- Pacific Coast
- Campestrian
  - Saskatchewan or True Campestrian subfauna
  - Okanagan subfauna
- Alleghanian
  - Western or Prairie Alleghanian subfauna
  - Eastern or Woodland Alleghanian subfauna

  } Transition Zone

- Carolinian (with Upper Sonoran)—Upper Austral
- Louisianian
  - The Gulf-strip and the Lower Sonoran together—Lower Austral

  } Austral Zone

Tropical Region:

Shown here in broad outline only.

INTRODUCTION

The Faunal Areas of America[1]

By far the most important factor in the distribution of life is *temperature.*

The grand temperature point in nature, the one at which all life conditions are changed suddenly, is the *freezing point of water*, and the two most important divisions of North America are shown by lines drawn across the continent indicating:

(a) The region in which water *never freezes*, and

(b) The region in which *always* there is some water frozen;

Or in other words:

(a) The south *limit of frost*, and

(b) The south limit of *perpetual frost* in the ground that is exposed to the direct rays of the sun.

These lines demark respectively the north edge of the Tropical and the south edge of the Arctic Realms; the region between is the Temperate Realm. Thus we have the primary division of the northern hemisphere into *Tropical, Temperate, and Arctic Realms*, corresponding with the distribution of plants and animals, and that portion of each which belongs to North America is called a Region.

1. *The Tropical Region.*

If the earth were flat and without currents of air or water, the north boundary of the Tropical Realm would coincide exactly with the geographical Tropic of Cancer (N. Lat. $23\frac{1}{2}°$), which is the northernmost limit where at some time each year the sun is directly overhead. It is virtually this line

[1]This is founded chiefly on Dr. J. A. Allen's *Natural Provinces of the North American Temperate Region* (1871), his *Geographical Distribution of the Mammals* (Bull. U. S. Geol. and Geog. Survey Terr.–Map I, 1878, IV, No. 2), his *Geographical Distribution of North American Mammals* (Bull. Am. Mus. Nat. Hist. Dec. 29, 1892, read Jan. 26, 1891), Dr. C. Hart Merriam's *Geographical Distribution of Life in North America* (Proc. Biol. Soc. Wash., April 13, 1892), and *Life Zones and Crop Zones of the United States* (Bull. No. 10, Biological Survey, 1898); with assistance in California from Joseph Grinnell's maps in *Pacific Coast Avifauna*, No. 3, 1902.

I have taken Dr. Allen's nomenclature as a basis, adopted Dr. Merriam's main lines of division, and, for the region north of the northern boundary of the United States, have proposed some new names and subdivisions.

modified by local influences, pushed northward by currents of warm water and southward by cool, high uplands.

This is the region where frost is *unknown*, where the summer is long and hot, and where there is no cold winter. It is the land of the palm trees, the parrots and Monkeys, the home of the black human races.

2. *The Arctic Region.*

Similarly, the south boundary of the Arctic Region is virtually the Arctic Circle (N. Lat. $66\frac{1}{2}°$), which is the south limit of day without night in midsummer, and night without day in midwinter; that is, the land of the midnight sun; and this would be the exact south boundary of the Arctic Region but that in America the cold currents of Hudson Bay, etc., and the warm currents of the Mackenzie and the Yukon, etc., have bent the line southward and northward as indicated.

This is the land of long, cold winters and short, mild summers, the country where *frost never leaves the soil.* It is a region *without trees*, the home of the White Bear, the White Fox, the Polar White Hare, the White Lemming, the white owl, and the snowbird.

And whether considered in the Far North or on the mountain tops which form Arctic islands in the warmer regions, its south or lower boundary is the best-marked faunal line in America.

3. *The Temperate Region.*

This lies between the two, and takes in the United States and the greater part of Canada. *Its north line is the limit of trees, its south line the limit of frost.* This is the region of long, bright summer, and of short, cold winter that comes with frost and snow. This is the range of deciduous trees, as well as of pines and spruces, the land of corn and wine, the proper home of the agricultural white man.

We are now concerned only with the Arctic and Temperate Regions. Each of these regions is divisible into life zones, which theoretically extend east and west across the continent.

These also are bounded on the north and on the south chiefly by the lines of temperature. Concerning these limits Merriam says: "Investigations conducted by the Biological Survey have shown that *the northern distribution of terrestrial animals and plants is governed by the sum of the positive temperatures for the entire season of growth and reproduction*, and that *the southward distribution is governed by the mean temperature of a brief period during the hottest part of the year.*"[2]

[2]Life Zones and Crop Zones, etc., 1898, p. 54.

But other factors enter the problem of distribution. Of these, humidity is probably most important. In North America it makes divisional lines and cuts each of the temperate zones in two or three segments called *Faunas*. This is a theoretical limitation. Elevation, proximity to areas of distribution, accessibility, etc., are elements to be considered in mapping faunal areas.

As a matter of practice the boundaries of the Faunas were arrived at by actual observation, thus:

When a great many of the well-marked life forms called species agree in recognizing a common limit, the fact is accepted as evidence that within that area is a set of conditions necessary to create a Fauna (or Flora).

A faunal area may be divided into several *Subfaunas*. These are, of course, less pronounced. When a species is found ranging over several Subfaunas it is usually represented in each by a geographical race.

The Arctic Region is divided into five faunas:

Alaskan, characterized by the Northern Fur Seal, Banded Seal, Pacific Walrus, Grant Caribou, yellow wagtail, emperor goose, Steller eider, Nelson gull.

Barren-ground, characterized in its main area by Muskox, Parry Ground-squirrel, Lemmings, snow-goose, willow and rock ptarmigans, etc. (*Ungava* and certain *polar islands* should probably be ranked as subfaunas of this.)

Greenland, characterized by Greenland Caribou, Ward Muskox, Greenland redpoll linnets, Reinhardt ptarmigan, and various European species.

Alpine, which is the top of each mountain that rises above timber line anywhere in North America, and characterized in places by white-tailed ptarmigan, rosy finch, pipit, etc.

Aleutian,[3] comprising the Aleutian Peninsula and contiguous islands, a treeless coast region characterized chiefly by peculiar species of Voles; also of birds, such as Alaska wren, gray-naped finch, gray song-sparrow, Nelson ptarmigan, Atkan ptarmigan, etc.

Some consider the Arctic to be of one fauna; if this view be accepted these five will be subfaunas.

The Temperate Region is divided into the following:

The Hudsonian Zone or *Fauna* comprises the northern or spruce belt of the great coniferous forest that stretches across the continent from Labrador

[3]In moving this from the Temperate to the Arctic Realm I follow Osgood, N. A. Fauna, No. 24, 1904, p. 24.

to Alaska—and that runs southward along the upper timbered slopes of the higher mountains of the United States and Mexico. It lies next the Barren-grounds of the north, and the Alpine of the high mountains, and in both is the region of stunted spruce and the home of many characteristic birds and mammals.

It is found in five subfaunas:

(a) The Hudsonian Subfauna or true Hudsonian, whose south limit is about summer isotherm 55°. Characteristic species are: northern shrike, common redpoll, Harris sparrow, tree-sparrow, white-crowned sparrow, gray-cheeked thrush.

(b) The Yukon Hudsonian Subfauna, the region of the White Sheep, the Alaskan Grizzly, several species of Brown Bear, etc.

(c) The Subalpine or Mountain Hudsonian Subfauna chiefly in Yukon and British Columbia, characterized by Mountain Goat, Black Sheep, Yukon Ground-squirrel etc.

(d) The Labrador or Atlantic Hudsonian Subfauna, characterized chiefly by very dark races of species that are widely spread over several faunas. In this subfauna, at Hamilton Inlet, is an island of the Canadian Fauna.

(e) The Newfoundland Subfauna. This is the Hudsonian part of Newfoundland; owing to its isolation it is fairly well marked. Its species are many; for example, the Newfoundland or White Caribou, the Newfoundland Lynx, Newfoundland Red-fox, Welch ptarmigan, etc.

The Canadian Fauna is the southern part of the great transcontinental coniferous forest and is prolonged southward, as shown, along elevated plateaus and mountains in irregular capes and islands as far as Mexico. Among the many characteristic mammals and birds of the Canadian Zone are the Porcupines, Woodland Caribou, Star-nosed, Brewer, and Gibbs Moles, Water-shrews, Voles and Long-tailed Shrews of various species, Northern Jumping Mice. The north limit of this fauna forms the northern limit of the large Skunks, the Star-nosed Moles, the Hoary Bat, the Woodchuck, etc. Its southern edge is also the southern limit of the Canada Lynx, the Wolverine, Pine-martens, Moose, Caribou, the Porcupines, and various species of Short-tailed Meadow-mice of the genus *Phenacomys*, etc. Characteristic birds are the white-throated sparrow, Blackburnian, yellow-rumped and Audubon warblers, olive-backed thrush, hermit thrush, three-toed woodpeckers, crossbills, and Canada jays.

It is found in two subfaunas:

(a) The Canadian Subfauna, or Canadian proper, extending in its

main area from the Atlantic Ocean westward to the east slope of the Coast Range. This is a land of coniferous trees and aspens. Among its characteristic animals are Moose, Woodland Caribou, Canada Porcupine, hermit-thrush, spruce grouse.

(b) The Rocky Mountain Subfauna, extending from Southern British Columbia southward along the higher mountains into Mexico. The Mountain Redsquirrels, Canadian Mountain-sheep, the Yellow-haired Porcupine, Yellow-bellied Marmot, Rhoads Marten, Baird Hare, etc., are characteristic of its main area.

The Sitkan Fauna might be considered a west-coast division of the Canadian. It is characterized chiefly by exceptional rainfall, dense forests, and dark-coloured races of birds and mammals that have a wide distribution; but it has very few distinctive species of animals.

The Pacific Coast Fauna, comprising the immediate coast from Queen Charlotte Islands down to middle California, characterized by mild winters, very heavy rainfall, forests of enormous trees, and many peculiar animals, as Sewellel, Coast Deer, Pacific Raccoon, and Gibb's Mole.

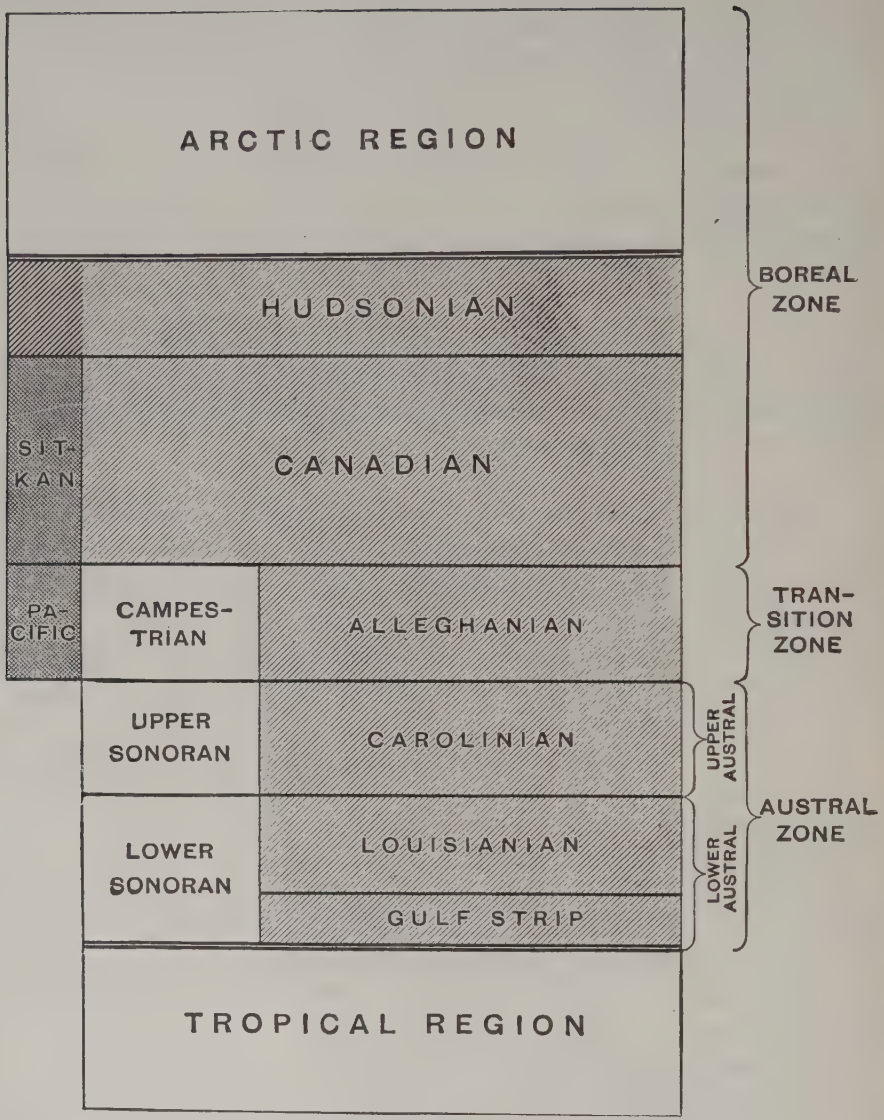
(N. B.—Merriam combines the Arctic Realm with Hudsonian, Canadian, and Pacific faunas to form his Boreal Zone.)

The Campestrian Fauna.—The region of the northern plains, where there is yet rain enough to banish aridity. In British America this appears as two subfaunas:

(a) The Campestrian proper or Saskatchewan Subfauna, of which characteristic species are: Richardson Ground-squirrel, Long-tailed Weasel, Northern Kit-fox, Northern Pocket-gopher, Prairie-hare, Richardson merlin, Columbia sharp-tailed grouse, white-winged blackbird. Its north limit is also the limit of western meadow-lark, McCown longspur, oriole, Cooper hawk, etc.

(b) The Okanagan Subfauna in Southern British Columbia, a dry region in which we find: Okanagan Marmot, Douglas Pocket-gopher, Pocket-mice (*Perognathus*), Jack Rabbit, Badger, White-tailed Deer, etc.

The Alleghanian Fauna takes in part of the new Province of Saskatchewan, southwestern Manitoba, most of southern Ontario and Nova Scotia. At its northern border the Alleghanian forms about the northern limit of the Panther, the Raccoon, the Mole-shrew, the bluebird, catbird, chewink, brown thrasher, and bobolink. Its north border is the south limit of Moose



MAP II—Diagram showing the relationship of the Zones and Faunas of the Temperate Region. A Zone usually comprises one or more Faunas. Subfaunas are not entered. The shading is heavy in proportion to the rainfall.

and Caribou. Its southern border forms about the southern limit of the Ermines, the Harbour Seal, the Common Chipmunk, several species of Field-mice (genera *Evotomys* and *Synaptomys*), the Snowshoe-hare, etc.

It appears in two subfaunas:

(a) The Western or Prairie Alleghanian Subfauna westward of Lake Michigan. Characteristic species are: Gray Chipmunk, Loring Red Vole, Minnesota Red-squirrel, etc.

(b) The Eastern or Woodland Alleghanian Subfauna chiefly east of Lake Michigan. Characteristic species are: Ontario Gray-squirrel and Northern Cottontail.

(The Pacific, Campestrian, and Alleghanian faunas together are Merriam's Transition Zone.)

The Carolinian Fauna, touching the extreme of southern Ontario, that is, the lower region along the north shore of Lake Erie. The northern boundary of this fauna forms, in a general way, the northern limit of the Gray-fox, the Northern Fox-squirrels, the Pine-mouse, the Opossum, and the Bats of the genus *Nycticejus*.

(The Carolinian and Upper Sonoran faunas together are Merriam's Upper Austral Zone.)

The Upper Sonoran Fauna is the arid land and Western continuation of the *Carolinian*. "Except in California, the most conspicuous vegetation . . . is the true sagebrush, which, however, is equally abundant in the *Transition* Zone. Several of the so-called 'greasewoods' are characteristic of suitable soils, and nut-pines (pinyon) and junipers occur here and there, mostly on the mountain slopes.

"Among the characteristic birds and mammals are the burrowing owl, Brewer's sparrow, Nevada sage sparrow, Lazuli finch, sage thrasher, Nuttall's poor-will, Bullock's oriole, rough-winged swallow, five-toed Kangaroo-rats, Pocket-mice, Grasshopper Mice, Sage Chipmunk, Sage Cottontail, Idaho Rabbit, Black-tailed Jack-rabbit, and the Oregon, Utah, and Townsend's Groundsquirrels."[4]

The Lower Sonoran Fauna comprises the hot, arid deserts of the Southwest. "Among the commoner plants are the creosote bush, mesquites, acacias, cactuses, yuccas, and agaves. Among the characteristic birds are the mockingbird, road runner, cactus wren, canyon wren, desert thrashers, hooded oriole, black-throated desert sparrow, Texas nighthawk, and Gam-

[4] Merriam.

bel's quail. Among the distinctive mammals are the four-toed Kangaroo rats, Sonoran Pocket-mice, Long-eared Desert Fox, and the Big-eared and tiny White-haired Bats."[5]

The Louisianian Fauna, as defined by Allen, took in the United States east of the Great Plains and south of the *Carolinian* except the tropical point of Florida. He names as characteristic species: "the Wood-rat, Cotton Rat, Cotton Mouse, Golden Mouse, Rice-field Mouse, Harvest Mouse, Pocket Gopher, the Southern Gray and Southern Fox Squirrels, the Marsh Hare, Swamp Hare, Little Striped Skunk, and a species each of Big-eared and Leaf-nosed Bats."

The Gulf Strip Fauna. Most authorities now separate this from Allen's *Louisianian.* According to Merriam, "it has a semi-tropical climate and is the home of a number of plants and animals not found farther north, among which are the cabbage palmetto, Cuban pine, ground dove, white-tailed kite, Florida barred and screech owls, Chapman's nighthawk, the Florida and boat-tailed grackles, and several small mammals."

(The Louisianian, the Gulf Strip, and the Lower Sonoran together are Merriam's Lower Austral Zone.)

Map 1 sets forth these main divisions, but cannot, of course, give the complex local details. As a matter of fact, every high mountain must and does exhibit a succession of faunal areas from its base to its summit. So that all the great mountain ranges of western Canada should be spotted on the summits with islands of Arctic fauna around which are Hudsonian rings. Furthermore, the valleys that run east and west are always more boreal on the shady side than on the north side, where the slope gives them more directly the rays of the sun.

To recapitulate, the Zones—Boreal, Transition, and Austral—are founded on temperature. The ranges of few, or no, animals follow these Zones throughout.

Zones are subdivided into Faunal Areas, that is, regions which are the definite ranges of peculiar forms of animal life. Variations of rainfall are usually considered the chief cause of these cross-sections, subdivisions of the Zones; but I personally believe that in a local sense at least, many other determining factors assert themselves.

In actual practice, I find that the range of an animal is most easily and accurately set forth by using the names of the Faunal Areas.

[5] Merriam.

The General Plan of Treatment for Each Species

In order to cover the ground more fully and systematically I have considered each animal under some five hundred different lights; that is, I have asked concerning each some five hundred different questions, using a schedule that I made for the purpose in 1898. It seems unnecessary to reproduce that here, but I give it in a condensed form under thirty different heads, asking of each in turn—What do we know of it in this department, or how far has it progressed along these lines? When nothing is said, it means that nothing is known. In the light of this, then, we are struck by the number of blanks and are thus brought to a realization of how much there is to be done. In many cases we have got no further than giving the creature a name.

The sections are briefly indicated below. Their order is varied whenever it has seemed best suited to the material.

Nomenclature:—The accepted or acceptable English names are first recorded; second, the scientific names used by the leading American mammalogists, with the important references. The French-Canadian names have next place.

Experience shows that a record of the Indian names may be of great service to travellers and historians; therefore I give them as fully as possible in the language of each of the tribes of importance or that I personally came in contact with.

In my earliest account of the "Mammals of Manitoba" (1887) I gave the Ojibwa and Cree names, and used a special alphabet that had been recommended by several ethnologists; but I found it open to at least two objections: first, that the ethnologists themselves were not agreed on it; and, second, that only the few who had the alphabet could use my list. The records were meant for the whole world of students, in and out of America. Therefore I have now followed Sir John Richardson's plan, and have given the Indian names in the English alphabet; the letter "g" being hard always.

Capitals:—Since this is a book on mammals, all are capitalized in this work.

Numbers:—When a number is used in an exact or mathematical sense I prefer to express it in figures; except for 1 and 2 figure divisions of time, or where obscurity might result, or when the number begins a sentence, or

when it is a very small number that stands isolated or when used in a personal sense—in which cases it is spelled out.

Gender:—When dealing with the animal as a race or species, I use the neuter gender as consistently as possible. When speaking of an individual I use the gender that seems fittest.

Description:—I have aimed to give only so much description of each animal as is necessary for identification, and even then have usually described each animal three times. Setting forth:

(a) The impression it makes as one sees it alive at a short distance.
(b) A sufficiently full description, assuming the specimen to be in hand.
(c) The peculiar points that will distinguish it from its nearest allies.

Measurements:—Three standard measurements are given:

Total length.—This is the distance in a straight line from tip of nose to tip of bone in tail (ignoring the hair), when the creature is fairly stretched out.

Tail.—Set the tail at right angles to the back, take the distance from the back to the tip of the bone in tail (ignoring the hair). This is the length of tail.

Hind-foot.—This is the distance in a straight line from the end of the heel to the tip of the longest claw.

The measurements, usually those of an adult male, are approximate. A 10-per-cent. variation over and under is understood. They are given in inches; in parentheses are their approximate equivalents in millimetres.

In the Horned Ruminants—known as Big Game—I have devoted some space to the subject of horns and antlers, and aimed to show the record heads. If any have been overlooked I shall be glad to have the facts for future use.

Speed:—The speed of wild animals is usually exaggerated. I do not believe that there exists anywhere on earth a wild quadruped that on level ground can outrun a good Horse. These facts I set forth in the "Coyote and Antelope Lives"; I have further gathered all evidence I could bearing on the gait, speed, and the climbing and swimming powers of the species treated.

Tracks:—The tracks of each species are drawn and one or two general principles pointed out. Predaceous animals commonly set the hind-foot in

the same track as the front-foot of that side; this correct register enables them to go more silently.

Tree-climbing animals, when running on the ground, bound, and commonly set the front-feet together in a line across the body; ground animals trot, or if they bound, set the front-feet in a line along the body. This corresponds with the hopping of tree-birds and the walking of ground-birds.

Scatology, etc.:—The dung and signs are of as great importance to the student as to the hunter. They offer much history of animals whose presence might otherwise be unsuspected, and they are here recorded as far as my material made possible.

Its mind:—After considering the visible animal the ground is clear to discuss the real subject, the *study of the little mind* that preceded and fathered the mind of man.

The first aspect of this study is environment.

Environment:—The environment is the creator of the animal, the mould in which each species was cast. Therefore, no two can have exactly the same environment, otherwise they would be one and the same species. We look for important light in determining exactly the environment that created each.

Range:—The range of the animal is part of its environment, and long ago I came to the conclusion that every creature is changing its range. So the question becomes not "Is it changing?" but "In what direction is it changing?" Is it winning or losing territory? In this connection it is noteworthy that the species with many extra-limital records are usually the ones that are extending their ranges. It looks as though these wanderers were the advance guard or scouts in a region that ultimately their tribe is to possess.

Maps:—The Maps, begun for the most part twenty-five years ago, aim to show the present distribution of the species, except when otherwise stated.

A spot with a ring around it stands for type locality.

Home Range:—The home range of each individual is next to be considered. No wild animal roams at random over the country; each has a home region, even if it has not an actual home. The size of this home region corresponds somewhat with the size of the animal. Flesh-eaters as a class have a larger home region than herb-eaters. The more evidence we get, the smaller the home region of each animal appears.

In the idea of a home region is the germ of territorial rights. At every step it presents close and interesting parallels with the growth of territorial law in man.

Migrations:—Some animals have two home regions, and make a regular seasonal change from one to the other; such animals are said to be migratory. Extremes of the habit are illustrated by the Woodchuck, individuals of which make a short move from the summer den in the open fields to a winter den in the woods, and by the Barren-ground Caribou, which makes a very complete migration from the open Arctic plains that it frequents in summer to the woods of its winter range, 500 miles away.

But there is another kind of migration, best illustrated by the Moose, though observed in many species. After dwelling for a number of years in a given region they move out in a body to some other and hitherto unoccupied region. The causes of this are not obvious.

Numbers:—An attempt is made, whenever possible, to estimate the actual number of each kind of animal. The data for the calculation are given so that the effort, if not satisfactory, at least affords a starting point for a better estimate.

The numbers of each species seem to increase and decrease in cycles varying from five to ten years. These periods, as far as possible, are recorded and note is made of every point that seems to account for the variations; nevertheless, they are far from being explained.

Food:—The food of each species is carefully considered as far as present light admits. Especially remembering that: Each is classed as the foe of all it feeds upon. Also that: In the food question we find the beginning of all property rights, even those of range.

Property:—The high development of the property instinct is remarkable in some of the lowest forms of mammalian life. Beginning with food or mates, it extends to nest and range, and, finally, to personal property that has nothing but an æsthetic claim to notice.

The devices used as property marks are most interesting. Some animals, as Bears, claw and gnaw the trees on their range—but most kinds use the scent produced by special glands. Of this class are Weasels and Wolves.

Storage habit:—The frugal habit of storing food is found in most of our higher animals, probably in all except the Horned Ruminants. It is one of the most civilized instincts, and attains its maximum development in those animals which store not for themselves alone but for their communities—of this class are Mice and Beavers.

Relation to light:—The relation of the animal to light is an interesting department of environment—as a general rule, birds are diurnal, beasts crepuscular. But there are few birds or beasts that prefer the full glare of noonday or the black gloom of a dark night. No animals can literally *see*

in the absolute dark; they need some light, but not much. Coons and Skunks are night creatures, Squirrels are sun-seekers, but most others, even Bats, are lovers of twilight.

Among savage nations there is a prejudice against sleeping in the moonlight. It is said to produce many kinds of trouble. I have sought for sound reasons in this or for parallels among the animals, so far without success. On the contrary, it would seem that some species, as certain Deer and Bats, regulate their movements to take advantage of the light of the moon.

Sociability:—Gregarious animals are not necessarily sociable. Bank swallows nest together, *i. e.*, gregariously, but do not assist each other in any important way—so are not sociable. Antelope run in herds at a time, so are gregarious, but do not unite their efforts for a common purpose, so are scarcely sociable. On the other hand, Wolves do not den in colonies or continually move in bands, yet they unite their powers to help each other in tasks beyond the strength of one, so are eminently sociable.

Sociability reaches its highest pitch in certain rodents, such as Voles, that have communal dwellings or villages under a crude law of common interest, or the Beaver, with its wonderful pond community—patriarchal rather than democratic.

Means of Communication:—Communication must progress with sociability. Other things equal, we find animals profiting by each other's society; that is, truly sociable in proportion as they have advanced in methods of communicating one with another, and *vice versa.*

While voice, gesture, and touch are widely used, the most surprising are the smell signals. These are highly developed in the Antelope and several other species, but are of less interest than the smelling-posts of Bears, Dogs, Wolves, Foxes, etc. These I have examined and treated at length.

Senses:—Evidence as to the powers of touch, taste, sight, hearing, smell, and direction have been sought for.

But some cases, like those cited in the Coyote, are so extraordinary and so difficult of explanation by the operation of the ordinary senses that many field naturalists have been led to believe in a special sense, called second sight or telepathy. Modern psychologists, however, do not accept the telepathic theory, but suggest, rather, that hitherto we have failed to gauge accurately the sense capacity of animals.

Amusements:—The evolution of amusements is a fascinating theme. We find all stages among our animals. A high pitch is reached when many adults of a species will meet together under circumstances divesting the meeting of any sex or food impulse, and engage in some friendly contest for

the joy of combat, without anger or danger. The highest stage is reached when there is a set place with special apparatus. This is seen in the Otter slide and the European Badger's game of "King of the Castle."

Mating:—The marriage customs of animals are full of human interest and lessons. There can be no doubt that at first animals were hermaphrodite, and that as soon as sex appeared, promiscuity was the order of the time. This, through ages of experiment, was displaced by polyandry and polygamy and these in turn by pure monogamy in the highest animals. So that although all forms are represented to-day, monogamy is proving its superiority.

Other things equal, a monogamous animal will beat a polygamous in the struggle for life. As a rule, the higher quadrupeds in North America that hold their own against man are monogamous.

The relation of the father to the family is important for observation here. As soon as he becomes a member of the family group, an entirely new and much higher plane is reached.

Home:—Home is the abiding place of the family. The home group among all higher creatures is essentially a trinity of father, mother, and young. Any other grouping with more factors or less is not successful; therefore, only the truly monogamous quadrupeds have a home. A study of the species herein treated shows this to be literally true. In each case I have endeavoured to describe in detail the home place of the species; including not only the nest itself with its linings and approaches, but the storage places, chambers, galleries, and ventilators in connection, as well as the burrows and above-ground runways, with their various signs and marks to indicate their direction, use, or owners.

Sanitation:—Coincident with the founding of a home must appear the rudiments of sanitation. The more elaborate the home the higher the idea of keeping it clean. The many devices of animals show gradation between the communal midden heaps of the Voles, the daily cleansing of the Wolves, and the wonderful dry-earth closets of the Pocket-gophers. I have sought to learn how far each species has progressed on this line.

Training of the Young:—While the young of some low animals never see their parents at all, but begin life with nothing save an equipment of instincts, others are wholly dependent on their parents, and the higher they are the more dependent they are and the more they profit by parental training. It was notorious among falconers that a falcon trained by its mother was always superior to one trained by man. The same remark applies to the Cheetah or Hunting Leopard of India.[6] Training is given chiefly by means of

[6]See Mamm. of India, T. C. Jerdon, 1874, p. 117.

example; whether consciously or not, I do not know. I do not know what consciousness is; it may be that most human acts are not conscious, but that is another question, and it does not alter the fact of training.

Love of the Beautiful:—Very few mammals show a love of the beautiful in sight or sound. The gift is much less developed than in birds, yet the faculty is not absent. It is, I believe, axiomatic that no creature can *respond* to music, much less produce it, without having pleasure in it. The readiness of the Coyote and the Gray-wolf to respond to certain sounds, and their power to produce sounds, some of which are highly musical even to us, are evidence of their having progressed far in this direction; and the enjoyment of the Pack-rat in its pile of glittering baubles is founded, as I see it, on no other sense than the love of the beautiful.

Morality:—It is possible to show that five of the Ten Commandments are natural laws, namely, the ordinances against disobedience, murder, impurity, theft, and falsification, the breach of which among animals entails severe punishment.

These things I have set forth in detail elsewhere.[7]

Vice:—Vice among animals affords an interesting field of enquiry. There is more of it than is generally known.

Vice I assume to be the deflection of any natural part or power from its proper purpose to one which works harm for the species. Thus we see self-mutilation among Monkeys and parrots. We see hens devouring their own eggs, the loco habit among range cattle and Horses, rare cases of infidelity among pigeons, of stealing among Pack-rats, and incest among geese, as well as unholy barren alliances between species wide apart.

We have, indeed, recorded among animals nearly every kind of vice that was known among men and forbidden by Mosaic law.

With few exceptions, however, these cases are among domesticated or captive animals; and the questions arise: Has all this evil been developed in the animals by their captivity? or has their captivity merely given us unusual opportunities for observing it?

The latter seems more probable, though there is some truth also in the former explanation.

Crime:—In the way of animal crime nothing is better known than infanticide by father or mother. In most cases it arises from man's interference with the young. If we handle the new-born young of a Rabbit the mother is likely to kill them; this I have seen many times. In menageries many little Bears are born and a large proportion killed by the mother. It may be objected that she killed them accidentally in her anxiety to carry

[7]See Natural History of the Ten Commandments, Doubleday, Page & Co., 1907.

them beyond the reach of man, but the detailed cases given in the Lynx and Otter chapters cannot be so explained. This generalization I draw: that when man tampers with the young it oftentimes so affects or obliterates the maternal instinct that the mother deliberately destroys her own offspring.

Whether or not this occurs in a state of nature is another question. The hunters and trappers generally believe that it does. The male parent especially is charged with occasional infanticide. The evidence is conflicting.

Suicide:—If suicide means realization of the fact that such and such an act means death and escape from certain unpleasant conditions, and that this full realization is followed by deliberate choice of death, then animal suicide is not proved and is not likely to be.

If, on the other hand, we allow it to be suicide when the animal, driven frantic by grief, pain, anger, or despair, blindly turns its destructive powers against itself—that is, allows its destructive or defiant instincts to overpower its self-preservative instincts with results disastrous and sometimes fatal—then is animal suicide of frequent occurrence.

There are many degrees of this.

An Orang which I was watching in Philadelphia flew into a fit of jealous rage on seeing the keeper give some favourite food to its neighbour only, and dashed its own head against the floor violently and repeatedly.

Wolves suffering the pains of poisoning often bite their own legs and flanks.

A Blackbear observed by Richard Kearton was so infuriated at its strong fellow prisoner getting all the cakes thrown in, that it bit its own paws.

In each of these cases we see a form of suicidal instinct which needs only to be pushed a little further to be literally suicide.

Enemies and Disease:—The enemies of each species should be considered and gauged with care. The struggle for life is at all times so bitter that each species is barely able to hold its own, has all the burdens it can bear (a thought that has its meed of comfort for us); a trifle more of destruction and down it goes, a trifle less and it spreads mightily.

Parasites are sometimes to be enumerated as disease. The kinds and the modes of combating them are important. But all parasites are not enemies. The species of fly which pupates in the dung of the Grizzly-bear is as likely to be a friend as a foe.

Odd partnerships:—One of the most interesting and obscure traits observed in wild animals is their unexpected friendships. The British Badger is known to share its den occasionally with the Fox, and the Fox with the

Rabbit. Instances are here given of a friendship between a Badger and a lost child, a Badger and a Coyote, also of a Red-squirrel and an Acadian owl, a Coyote and a Cougar, a Coyote and a Blackbear.

Whatever the explanation, it is always gratifying to find that any animal has reached a plane above the purely carnal.

Commensalism:—Strange comradeships and parasitism are on opposite sides akin to commensalism. Of this nature is the habit seen in some Mice, of quartering themselves on the hoards of certain Ground-squirrels.

Many cases not easily classed will come to mind. For example, the Water Shrew that lives in the Beaver house, the fly that pupates in the Bear's dung, the beetles that live in the filth at the bottom of a Red-squirrel's nest.

Age:—Quadrupeds are supposed to live from four to five times as long as the time they need to attain maturity. Their life is in three parts: youth, prime, and age. Many facts in line with this belief are adduced, as well as all available data fixing the normal life term of each species.

Strange incidents:—Strange incidents not referable to any of the above constitute another chapter.

Relation to man:—Finally, space is devoted to a consideration of the animal in its relation to man; either indirectly as a help or hindrance to agriculture or as source of commercial products.

References to a work that is cited but once in the "Life" are given in full in the footnotes. When a work is several times quoted, a brief catch-title is used at the place and the full title given in the "List of References" at the last part of the "Life."

LIVES
OF
GAME ANIMALS

Volume I

Order Carnivora or Flesh-eaters

CATS, WOLVES, AND FOXES

ORDER CARNIVORA OR FLESH-EATERS

Mostly large animals (except the Weasels). All our species (except the Sea-otter) have six small incisors in each jaw; all have *four large canine teeth*, and the premolars developed, not to grind, but to cut like shears.

1. Family Felidæ or Cats

Large, digitigrade animals, clad in fur that is striped or spotted. In some cases, the spots disappear with maturity. Tail, usually long; 5 toes on fore-feet and 4 on hind, all with sharp, retractile claws; skull, short and broad; face, flattish; ears, well developed, and, in all our species, dark behind with light central spot; tongue, set thickly with horny points, curving backward for bone-scraping; clavicles, small and floating.

Teeth usually: Inc $\frac{3-3}{3-3}$; can. $\frac{1-1}{1-1}$; prem. $\frac{3-3}{2-2}$; mol. $\frac{1-1}{1-1} = 30$

Genus *Felis* Linnæus, as above, but with long tail.

Genus *Lynx* Kerr, as above, but with short tail, tufted ears, and premolars $\frac{2-2}{2-2}$, total 28.

2. Family Canidæ or Wolves and Foxes

Large, digitigrade animals, clad in fur, without spots or regular stripes, tail, long and mostly bushy; ears, large, usually brown or dark behind and without the central light spot; 5 toes on front and 4 on hind-feet; claws, blunt and not retractile; muzzle, long and sharp; tongue, without bone-scraping points.

Teeth: Inc. $\frac{3-3}{3-3}$; can. $\frac{1-1}{1-1}$; prem. $\frac{4-4}{4-4}$; mol. $\frac{2-2}{3-3} = 42$

Genus *Canis* Linnæus, as above, but form robust, size large, and tail less than half the length of the body.

Genus *Alopex* Kaup, in skull, etc., between *Canis* and *Vulpes*, the ears short and rounded; the soles of the feet clad with dense bristly hair.

Genus *Vulpes* Brisson, as above, but smaller, form more slender; snout, sharp; tail more than half the length of the body; claws semi-retractile; eye-pupils, linear.

Genus *Urocyon* Baird, like *Vulpes*, but teeth different in detail. The temporal crests are widely separated, and the lower jaw has a double angle at the back below. The mane on the tail is common in some degree to all our *Canidæ*.

FAMILY FELIDÆ

LIFE I—THE JAGUAR

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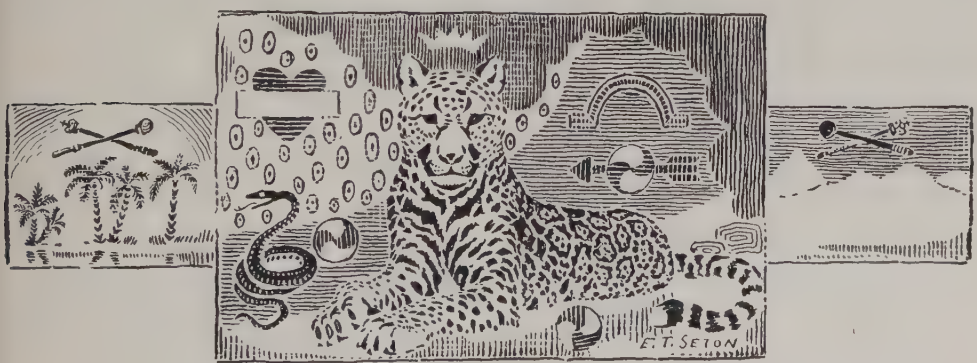

The Shirit of the Jaguar

The Jaguar, American Tiger, American Leopard, Mexican Tiger, Ringtailed Panther, or Spotted King-cat

Felis onça Linnæus

(L. *Felis*, a Cat; *onça*, the Portuguese name of the animal; akin to *ounce*, the Snow-leopard)

Felis onça Linnæus, 1766; Syst. Nat., XII, p. 61.
Type Locality—America meridionale, *i. e.*, South America

Felis onça hernandesii (Gray), 1857, Proc. Zoöl. Soc., p. 278.
Type Locality.—Mazatlan, Sinaloa, Mex. The form dealt with here is *F. hernandesii*

Spanish, *Ounça or Onza* (Azara).
Mexican, *El Tigre.*
Apache, *Tutinquillé* (Baird, Mex. Bd., p. 7).
Kammei Tribe of Southern California, *Hút-te-kul* (Merriam).

The word "Jaguar" is native American. It appears in the forms *Jaguara* and *Yagouareté* Also according to Felix de Azara (p. 184), as *Yaguarete*, *Yagua*, *Yaguaeté*, *Yaguapara*, *Yaguara*, and *Guazuara;* also for a kindred but small, plain-coloured species as *Yaguarondi.*

It stands for the largest of the American spotted Cats, whose range is from Patagonia to the Texas Red River and southern Arizona. They vary so greatly in colour, size, and details of anatomy, that many scientists reckon them as several distinct species lumped under the popular name. There are at least several well-marked geographical races, but the huge gray Jaguar of Paraguay and the brightly coloured dwarf forms of Mexico show no greater divergence than do the various White-tailed Deer found in the United States.

The old name *Felis onça* is now confined to the Jaguar of Brazil, which country is what Linnæus meant by "America meridionale."[1] The giant Jaguar of Paraguay has recently been described as separate, under the name of *Felis paraguensis* Hollister.

The Mexican Jaguar was described by Gray in 1857 as *Felis hernandesii.* This is the only form that enters our borders. Compared with typical *onça* it is much smaller and paler, with the black markings small.

[1] Brisson: Le Règne Animal, 1756, p. 270.

A beautiful ♂ taken by J. H. Batty in Escuinapa, Sinaloa (Am. Mus. 25009) Aug. 26, 1901, is as follows:

Total length, 68 in. (1727mm.); tail, 24½ in. (622 mm.); hind-foot, 9 in. (229 mm.).

Baird says that the largest Jaguar skin that he saw was taken at Las Mores above Eagle Pass; it was nearly 5 ft. long without the tail.[2] An average male is 7½ ft. in total length; an average female 6½ ft.

A large male Jaguar killed by John M. Phillips near Tampico, Mex., Dec. 21, 1910, was measured: Total length, 6 ft. 6½ in. (1993 mm.); tail, 21 in. (533 mm.); height at shoulder, 28 in. (712 mm.); girth of head, 25 in. (635 mm.); of neck, 24¾ in. (628 mm.).[3]

Colour of the above Sinaloan specimen: All the upper and outer parts of a warm buffy yellow or golden tawny, and all the under parts white with black spots everywhere. These spots are small (½ in. to 1 in. across) where they fall on the tawny, especially on head, shoulder, and forearm, and much bigger where they fall on the white. On the white they are up to 3 or 4 in. long. On the white of the shoulders and chest they unite to form 2 or 3 short crooked bars; and on the back they are so black, solid, and close that they form a chain—almost a dark band. The ear is black behind with a central spot of buff, and dull white inside. The tail is buff above for two thirds; the last third, *i.e.*, the tip, is white, with solid black spots everywhere. Those on the last third, the white portion, are so solid as to form 3 or 4 nearly complete rings. There is a black outline to the mouth, beginning under the whiskers on each side. This soft golden buff common to nearly all royal Cats looks positively luminous as it peeps from under a jet-black spot, and yet it can be exactly matched in the pale soft tan we see on the Coyote's legs, the Cottontail's nape, the Chipmunk's flank, or the Gray-squirrel's paw.

But the strongest feature is the pattern of broken rings or rosettes of black along the sides, each enclosing a slightly deeper area of buff on which are one or two black dots. Normally these central dots are not found in the Leopard, and they are partly or almost wholly absent from the giant Gray Jaguar.

There is, however, no part of the above Jaguar description that does not apply, word for word, to African Leopard skins, now before me. The tangible differences are, the central dots on the side rosettes, the bars on the chest, and the short tail of the Jaguar. Nevertheless, these colour features are not absolute, for one of the Congo Leopards has a few central dots on the side rosettes and the beginning of bars on the chest.

[2] Mamm. Mex., Bd., p. 8.

[3] In the Open, Pittsburgh, March, 1912, p. 12.

But the Leopard is 7 ft. long (2134 mm.), has a tail 36¼ in. (921 mm.), hind-foot, 10½ in. (267 mm.); that is, its tail is a foot longer than that of the big Jaguar, which was probably twice its weight.

It is a remarkable fact that the tail of any one of the Cats, Foxes, Rabbits, or Deer, will distinguish the species more readily and certainly than any other external feature.

Young: Description of the colour is given in the section on "Young."

Melano, that is sooty or nearly black specimens of Jaguar, are often found. They are merely freaks. The spots show still blacker on the dark ground. The Mexicans call them *Tigre negro*.

Albinos, according to Humboldt, have been seen in Paraguay; in these "beautiful" specimens, the spots are so pale as scarcely to show on the white ground.[4]

Weight. The Jaguar is the largest of the American Cats; much heavier than the Cougar or even the Old-world Leopard.

John M. Phillip's big male, cited above, weighed 176 lbs., though in poor condition. George K. Cherrie considers that an average male Brazilian Jaguar will weigh 250 lbs., and a very large one 300 lbs.; an average Brazilian female about 200 lbs.

In Mexico they are much smaller.

Dan J. Singer, the well-known sportsman, gives the ordinary weight of Guiana specimens at 160 or 200 lbs.

Roosevelt says of his Jaguar that it was heavier than the 227-lb. Cougar he killed in Colorado and as heavy as an adult African Lioness.[5]

Humboldt speaks of a Jaguar, "the largest he ever met," whose length "surpassed that of any Bengal Tiger I had ever seen in the Museums of Europe." (This was near Cano de la Tigrera, near San Fernando de Apure, in the Orinoco country.)[6]

The Paraguay Jaguar, however, must be at least twice as heavy as the Mexican species, for it has the size and powers of a Tigress. The gigantic specimen brought by Roosevelt from Corumba, Brazil (Am. Mus. 36950), measured on the dry skin, is 98½ in. in total length, of which the tail is 26½ in.; the hind-foot is 11½ in. In colour this specimen is peculiar, its ground colour being of a pale sandy, and the central black dots of the rosettes are almost wholly absent.

In the Museum of the Jardin des Plantes, Paris, is a Jaguar skeleton that is as large as that of an ordinary Tiger. The skull is 13½ in. in length

[4] Pers. Narr., II, p. 267.

[5] Braz. Wild., p. 81.

[6] Pers. Narr., I, p. 189, and II, p. 157.

from the upper alveolar ridges to the point of the occipital crest; from snout to sacrum is 64 in., and the height at the shoulder $33\frac{1}{2}$ in. This last can, of course, be varied by the play of the bones, can indeed be unfairly increased, but the body length cannot; it must have been at least as long as given. This specimen then was as large as an ordinary Tiger and must have weighed over 300 lbs.

Races

Two forms of *hernandesii* have been recognized:

hernandesii Gray, the typical form as above, T. l., Mazatlan, Mex.
goldmani Mearns, similar but of deeper colour and larger black markings. T. l. Yohaltun, Campeche, Mex.

Range, with Map

The Jaguar, originally described by Linnæus, from South America, is now found to have a very wide dispersal in Central and North America. Its southern limit is given by Mivart[7] at 40° So. lat., that is, the north border of Patagonia.

It is found generally in South America, even west of the Andes in all wooded sections; in Central America and Mexico up to the south boundary of the United States, beyond which it is accidental now, except in Texas and Arizona.

According to S. F. Baird in 1859: "This species is found through the greater part of eastern Texas, extending as far as Red River. It is quite probable that specimens have been killed within the limits of Louisiana, as at present constituted. Southward it ranges through Brazil (where it is abundant) and Paraguay as far south as the Rio Negro"[8]; and on the same page Baird quotes the following from C. B. R. Kennerly who was one of the naturalists on the Boundary Expedition:

"This large Cat, so common in southwestern Texas, especially along the lower Rio Grande, is rarely seen so far north as El Paso del Norte. The only individual observed by our party west of the latter place was seen in the Sierra Madre, near the Guadaloupe Canyon [Chihuahua.] However, we were assured by many persons of Santa Cruz that it was very common near that village, in the valley of the river of the same name."

On the map I have indicated all the definite records in the United States. It is now nearly extinct as a resident within our limits.

[7] The Cat, 1881, p. 398.

[8] Mamm. Mex. Bd., p. 7.

MAP III. RANGE OF THE JAGUAR IN NORTH AND CENTRAL AMERICA

By E. T. Seton, with assistance of the Biological Survey, 1923

All available records in the United States are spotted on the map and discussed in the text. The Colorado record and the three about San Francisco are very doubtful. In Texas the species is probably extinct, except along the Rio Grande.

Records

In California

The following three records for the San Francisco region are not accepted by the Biological Survey, who maintain that they are too vague. They may have referred to Mexico, or to young Cougars in the spotted coat.

(?) G. H. Von Langsdorff mentions it thus, among the wild animals found about the settlement of San Francisco: "The American Lion, *Felis concolor*, the American Tiger, *Felis onça*, Stags, Roes, Wolves, Foxes, Bears, and Polecats, *Viverra putorius*, are very common here; the latter is called by the Spaniards *Sorrillo*."[9]

(?) Beechey says it is a native of the wooded country between San Francisco and Monterey and adds the helpful details that "the Lion (*Felis concolor?*) and the Tiger (*Felis onça*) are natives of these woods, but we never saw them; the inhabitants say they are small, and that the Lion is less than the Tiger but more powerful. A large species of Mountain Cat (*Gato del Monte*) is common."[10]

(?) Pierre Charles de Saint-Amant, who travelled in California and Oregon during 1851–52, describes the hunting and killing of a Mountain Lion, Puma, or Cougar (*Felis puma*) which his party encountered near San Francisco Bay, and the feast which all enjoyed of its flesh,[11] then adds: "There is also in California the American Tiger, or Jaguar. It inhabits the back country and I never had the luck to meet it. It is reckoned more formidable than the Cougar, like it, readily climbs trees. A French doctor that I knew encountered one in the environs of Presidio; it tried to kill his Dog. The Jaguar can carry off a Horse or an Ox a very long way. It is chiefly during the night that it seeks its prey and makes its victims."[12]

Merriam writes concerning the Jaguar in California: "An old chief of the Kammei tribe (called by the Spanish 'Diegenos') told me that in the Cuyamaca Mountain region in San Diego County, the 'Tiger,' while rare, was

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[9] Voy. and Trav., II, p. 213.

[10] Narr., II, p. 403.

[11] Voy. en Cal., pp. 534–6.

[12] As above, p. 537.

well known to the old Indians who call it the 'Big-spotted Lion,' Hut'-te-kul."[13]

James O. Pattie, who made the overland trip in 1824–30, relates that on Dec. 12, 1829, he killed a Jaguar on an island of the Colorado River below its junction with the Helay [Gila]. After referring to Deer, Foxes, Wildcats, Panthers, etc., with which he was evidently familiar, he says: "We killed some wild geese and pelicans, and likewise an animal not unlike the African Leopard, which came into our camp, while we were at work upon the canoe. It was the first we had ever seen."[14]

But the latest and most convincing of these Californian records is by Grizzly Adams (J. C. Adams), who, in the summer of 1855, discovered a family of Jaguars, male, female, and their young, in a rocky cavern on the south side of Tejon Pass in the Tehachapi Mountains, facing eastward over the Mohave Desert. He did not secure specimens, but all authorities who have read his record accept it as safe. His account is fully set forth in the section on "Habits."

In Arizona

Prof. Charles T. Vorhies writes me as follows: "I. E. Roberts of Tucson saw a Jaguar cross the Silver Bell highway about 3 miles northwest of the city one evening in September, 1920. Exact date could not be supplied, although I interviewed Mr. Roberts in October. The animal crossed the road ahead of the automobile in which the observer was riding, and stopped at a distance of only about 50 yards, faced about and stood watching the car. As this was an hour before sundown, and the observer reported a perfectly clear view of the animal, describing it as spotted, etc., and even observed the catlike switching of the tail, there seems no chance for error. Mr. Roberts personally related the incidents to me.

"On the occasion of a visit to the Chiricahua Mountains, in 1918, I was shown a beautiful Jaguar skin in the possession of Mr. E. J. Hands, who told me of shooting it after a chase ending with the cornering of the animal in a small cave. Later, in 1921, I wrote to Mr. Percy Hands, a brother, whose address I knew, for details and date of the killing of this specimen. He wrote me as follows concerning the case: 'It had been killing Cattle and Horses at various places on the west side of the range for some time, but as it had not been seen, the killings were attributed to a Lion. Its tracks were first seen on the east side of the range . . . on January 6, 1912, by myself. A calf was killed, also a cow, and partly eaten on Bonita. The stock

[13] Journ. Mamm., Nov., 1919, p. 40.

[14] Pattie's Personal Narrative, 1905 edition, p. 194.

killed, I believe, were owned by Stafford who had a small ranch on Bonita. Tommy Stafford and others set a Bear trap at the kill and trapped the Jaguar. They tracked it for some distance but could not follow it and sent for my brother Edward J. to help them. . . . About 10 o'clock at night John (E. J.) came to camp. He had kept the trail for a considerable distance, then lost it, and decided to come for us and make a new start early in the morning. Just at dusk he ran on to the trail again on Bonita Peak. We started early, quickly picked up the trail, and after about an hour's trailing I located the Jaguar in a kind of cave worn by the elements in the soft rock. I tracked him in, but as I could not see his track leaving, I set my rifle against the rock and got on my hands and kness and crawled in about 3 or 4 feet to see. He was lying down tired out from dragging the heavy trap—19 pounds, I believe it was. I woke him, and heard the chain and trap rattle about 4 feet from me in the dark and I need not tell you what I did next. When outside I called to John and Frank. They came up, John and I took each a side and Frank kneeled down looking in. The Jaguar lowered his head to look out and Frank shot him through the head and killed him. The date was Jan. 12, 1912.'

"Another Jaguar was trapped and shot by a party in the Chiricahuas several years before. I was not there at the time, and names and dates are too hazy to be of value.

"Besides the above records and reports, I can only say that two Jaguars have been taken in the Santa Rita Mountains since I have been more or less acquainted with that country. These were taken by government trappers, and the only way to get certain dates would be through Musgrave. However, my own recollection . . . is that the first one was taken about 5 years ago, which would make it the winter of '17–'18; and the second about 3 years ago, or the winter of '19–'20. Mr. Nicholson also has told me of an experience of several years ago in this range, in which some Mexican miners working night shift in a mine became fearful of going over a certain ridge to camp at 3 A. M. They claimed some large animal appeared each night and frightened them. He accompanied them finally and heard the animal scream, and saw it outlined against the sky, but could see no colour, owing to the darkness. He fired at it but missed, and it was not seen again. He believes it to have been a Jaguar.

"A good many years ago, a Jaguar was killed in the Baboquivari Mountains, and one at least has been killed in the Santa Catalinas. Concerning these I have no dates. Both these were taken before I came here in 1915. I am inclined to think that the Santa Catalina record was about 1912.

"I have given you in the above *everything* I know of Jaguars in south-

ern Arizona, though much of it is of little value except to show that they have not been so rare as might have been supposed.

"I might only add as a matter of interest in general, that a High School boy living northwest of Tucson reported to his principal, whom I knew personally, that tracks of Mountain Lion and Bear were not uncommonly to be seen in the near neighbourhood of his father's ranch, always going one way or the other in the line connecting the west end of the Santa Catalinas and the Tucson Mountains. They believed that migrations between the ranges along this route often occurred. The live Jaguar seen in 1920 must have been about on this route, and it was going toward the Catalinas."[15]

E. A. Goldman sends me the following additional Arizona record. A Jaguar was "killed by J. H. Durham at his cattle ranch in the Tortolita Mountains, about 30 miles northwest of Tucson in 1913. I saw the skin of this animal. The Jaguar seems to cross the Mexican line much more frequently than the Ocelot."

Nelson writes in 1918: "Several have been killed within our borders during the last 10 years, including one not far from the tourist hotel at the Grand Canyon of Arizona."[16]

The Holbrook *Observer* of Jan. 20, 1920, records that a large Jaguar was killed at Rincon Mountain, Ariz., "on Saturday" by Stanley R. Graham and party, of Chicago.

In 1922, Dr. Harry Garcelon of Victorville, Calif., told me that in 1907, when in Arizona, he was shown the skin of a Jaguar that had recently been killed on the Mogollon Mountains near Fort Apache. He says Jaguars are still found in the box canyon of the Rio Grande and in Donna Ana County, N. M.

In New Mexico

The extraordinary case of the murderous Jaguar of Santa Fe in 1825, is fully set forth later. This happens to be the northmost positive record, as well as the most detailed and amazing story of a Jaguar's ferocious exploits.

Baird gives it in good faith, and it seems to be a reliable New Mexico record. The question has been raised as to whether the Santa Fe mentioned was not some other place, maybe in South America on some other Rio Grande, as the account pictures a town on a broad river which is dotted with wooded islands. The results of my investigations are given in the section on "Attacks on Mankind."

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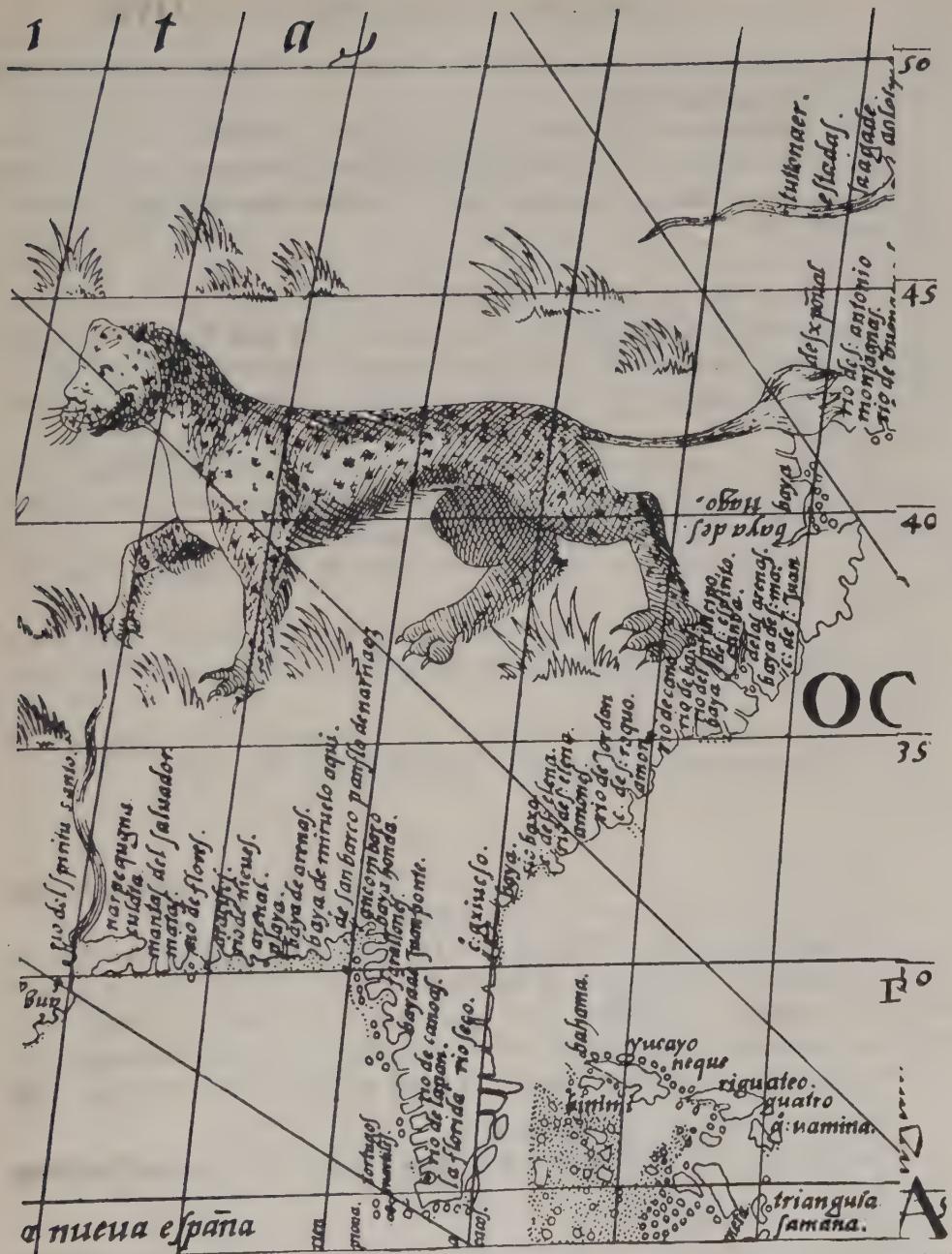
[15] Letter, Feb. 22, 1923.

[16] W. A. N. A., p. 413.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tuttomaer.
esladas.
la agiade
antiqua
Rio de s. antonio
o montagnes.
rio de buena.
baya des
magdalena.
baya de s. juan
baya de armes.
baya de miruelo aqui.
de san barco puesta de naranjas
baya de armes.
baya de armes.
baya de armes.

Nat Straw is said to have killed a Jaguar on Taylor Greek, Socorro County, N. M., May, 1900.[17]

The earliest historic North American record is by Coronado in 1540, as follows: At Cibola, that is Zuni, "Bears, Tigers, Lions, etc. . . . For game, they have Deer, Leopards, etc."[18] Purchas translates the Leopards as "ounces."[19]

In Texas

Audubon and Bachman record that in 1845 it was found about the watering places in the region near San Antonio de Bexar. Col. [John C.] Hays of the Rangers, they say, killed 4 Jaguars during his stay in Texas about 1845.[20]

Gen. Sam Houston told Bachman that he had found the Jaguar "east of the San Jacinto River and abundantly on the head waters of the eastern tributaries of the Rio Grande, the Guadaloupe, etc."[21]

Capt. J. P. McCown, U. S. A., saw one in his camp near the Rio Grande.[22]

"The westernmost specimen of the genus was seen in the Guadaloupe Canyon (Sierra Madre) by Mr. J. Weyss, one of the assistants of this Commission."[23]

Vernon Bailey records the killing of a large Jaguar near London, Kimble County, Texas, near the Llano River, in the spring of 1910.[24]

In Colorado

The following may be a good record. If so, it is a new animal for the Colorado list, but is entered as very doubtful.

(?) Rufus B. Sage, while camped on Soublet's Creek at the base of the Rockies on the headwaters of the Platte, within 30 or 40 miles of Long's Peak and 2 days' march from Fort Lancaster, in December of 1843, says: "One of our party encountered a strange looking animal in his excursions, which, from his description, must have been of the Leopard family. This

[17] Barber: Proc. Biol. Soc. Wash., XV, 1902, p. 192.

[18] Winship translation of Coronado's letter to Mendoza, Aug. 3, 1540, 14th Ann. Rep. Bur. Ethno., pt. I, p. 560.

[19] Pilgrimage, 1613, p. 966.

[20] Q. N. A., III, p. 5.

[21] As above, p. 6.

[22] As above.

[23] Mamm. Mex. Bd., p. 7.

[24] Forest & Stream, Jan. 7, 1911, p. 11.

circumstance is the more remarkable as Leopards are rarely found except in southern latitudes. However, they are not unfrequently met in some parts of the Comanche country, and their skins furnish to the natives a favourite material for arrow cases."[25]

As Sage was quite familiar with Panthers and Bobcats, this may have been a Jaguar, or, though much less likely, an Ocelot.

As will be noted more fully later on, the Jaguar is excessively given to travel. It is a far roamer, going even hundreds of miles from its native headquarters. This accounts for most of the Jaguar appearances in the United States, and also contains promise of more Jaguar records in the future.

[25] Rocky Mountain Life, p. 347.

Numbers

In South America the Jaguar has always been plentiful. Humboldt says: "These animals are very frequent in the tracts situated between the Cerro Maraguaca, the Unturan, and the banks of the Pamoni."[26] Then adds on the same page: "This frequency of large Jaguars is somewhat remarkable in a country destitute of Cattle. The Tigers of the upper Orinoco are far less bountifully supplied with prey than those of the Pampas of Buenos Aires and the Llanos of Caracas, which are covered with herds of Cattle. More than 4000 Jaguars are killed annually in the Spanish colonies, several of them equalling the mean size of the royal Tiger, of Asia! Two thousand skins of Jaguars were formerly exported annually from Buenos Ayres alone."

This is all along the line of well-known information, but most are surprised to learn that in southwest Texas, according to Kennerly, it was common in 1859[27] and, as already noted, according to Gen. Sam Houston, abundant on the Rio Grande and Guadaloupe, in the '40's.[28]

Outside of this region it was always a straggler, and at the present time it is little more than a rare fugitive inside this region. For there is no doubt that the species is all but exterminated in the United States, and any individual discovered to-day is most likely a wanderer from the wilder regions south of our border.

Haunts

The Jaguar is an animal of the well-watered dense forests in the tropical or subtropical parts of the Western World; and its distribution within these limits depends on the local food supply and proximity of the region to its centre of abundance. Thus, it might have been perfectly at home in Florida with its wet forests and wealth of Deer and turkeys, but evidently the intervening regions were possessed of elements or influences that had the force of an impassable barrier to the Jaguar kind. There was plenty of food and some suitable forest in the southern parts of New Mexico; and being contiguous to its Mexican range, there were always stray pioneer Jaguars venturing out to possess these new lands. But the climate probably

[26] Pers. Narr., II, p. 470.

[27] Mamm. Mex. Bd., p. 7.

[28] Q. N. A., III, p. 6.

was too severe; for the species can be considered only accidental in the United States except in the low forests of southern Texas and the southeast corner of Arizona, where heat, timberland, and abundance of game appear to have given it a permanent footing.

Compared with the Cougar, it is less of a mountain and more of a forest animal. The Cougar loves the half-open woods, varied with broken ledges, the haunts of Muledeer and Mountain Sheep; the Jaguar prefers the impenetrable thickets along river bottoms where the Whitetail Deer and smaller game find harbour. Possibly it is not straining a point if we claim that the Jaguar's spotted coat reflects this fact, for it looks like broken sunlight falling through foliage on a log or bump, while the Cougar living in more open places, and therefore more often seen by other wild things, is coloured rather to be like the Deer it preys on, and is easily mistaken for it.

Tree-climbing Habits

The Jaguar and the Cougar are called "the Tiger and Lion of America," and it is interesting to note that the two King-cats of the Old World are ground animals and never climb; whereas our own two species take to the trees on occasion, and spend a part of their time aloft, hunting, sleeping, or loafing. According to many authorities, they readily climb and travel about in the roof trees of the forest whenever it may serve their passing whim to do so. But it is well to remember that tree-climbing is largely a question of weight. The 400-pound Lion and Tiger and the 800-pound Grizzly never climb. Their lesser cousins, the Jaguar, the Cougar, and the Blackbear, climb whenever it suits their purpose. But it is the smaller kinds, like Squirrels and Monkeys, that really live in the treetops.

The Voice of the King-cat

Like most of the Cat tribe, especially the larger ones, the Jaguar is very noisy at times, and has a great variety of sounds for use as expression. Humboldt's narrative refers continually to the cries of the Jaguar in the jungle at night.

Grizzly Adams heard it many times uttering a roar which "was loud but clear, short but piercing, differing from any roar I had ever heard."[29]

According to Azara, the Jaguar "utters loud cries by night, especially in the love season, in a very deep and hoarse tone, *Pu, pu, pu,* very frequently repeated.[30]

John M. Phillips likens the call of the Jaguar to a hoarse cough like

[29] Adv. J. C. Adams, p. 357.

[30] Nat. Hist. Para. p. 186.

"uh, uh, uh, uh," repeated a dozen or more times, but maintains that it never utters a roar at all resembling that of a Lion.

So also George K. Cherrie tells me that the sound of the Jaguar is never a roar of the Lion type. It is, nevertheless, the most fearful sound he ever heard in the wilds. Beginning with short, guttural "uh, uh, uh's," it increases them in rapidity and volume, till, after a dozen repetitions, the final "uh's" are short roars of appalling power and effect.

All of these descriptions agree with and are endorsed by W. H. Blackburne's observations in the Washington Zoo.

Mating and Young

From the few facts at hand it is evident that in North America the Jaguar love season is January and that the species is monogamous.

Observations on the captives in the Berlin Zoo showed that gestation continued in various cases for 99, 101, 105, 99, 100 and 101 days; $3\frac{1}{3}$ months, or 100 days being normal.[31]

In Mexico—and of course within our limits when it does occur—the young are born in April or May; for it is part of Nature's plan to have them arrive at the pleasantest time of the year, or at least so that they will know nothing of hardship until they are strong enough to stand it.

In equatorial America, it is arranged otherwise. Since there is no cold weather to fear, the younging-time varies greatly.

The species bring forth 2 to 4 cubs at a birth. Their fur is somewhat like that of the parents, but much longer, and woollier in texture.

A young one, three-quarters grown, from Paraguay (Am. Mus. 36654), is more heavily spotted than the adult. Many of the brown spots on the lower back have an unbroken outline of black, as well as two inner dots. The general scheme is much like that of the Ocelot; indeed, it might pass for a brownish Ocelot but for the total absence of the long stripes on the neck, this part being heavily spotted as in the adult.

When the cubs are a month or 6 weeks old, according to the balance of opinion, they are about as big as a common Cat and begin to follow their parents about. As the mother is, in power at least, a common Cat multiplied some 30 diameters, one can readily believe that there is not a creature in the woods that at this time dare approach the young to do them harm. Indeed, there is not a living thing on earth that she would not face and fight to a finish if it seemed necessary for their protection.

So far as can be ascertained, the male is a permanent member of the family, a loyal husband and father, helping with all his noble powers to feed.

[31] Dr. O. von Heinroth, Zoöl. Beobachter, XLIX Jahrgang, Frankfurt a. M., 1908, p. 16.

protect, and train his offspring. Most of the light we have on their family life is from Grizzly Adams's account as given later.

At the end of a year, according to Dan J. Singer, they shift for themselves. They breed at three years and may live to be 20.[32]

Home-life

As a marvellously interesting record, as well as a strong picture of this creature's home-life, I give in full Grizzly Adams's adventures with a California Jaguar.

In the summer of 1855, accompanied only by his dog Rambler and his 2 pet Grizzlies, Lady Washington and Ben Franklin, he was on a hunting trip in the Tehachapi Mountains, and had made his camp on the south side of the Tejon Pass, on the great slope that faces eastward over the Mohave Desert. I give the rest in his own words:

"I was suddenly aroused at midnight by a fearful snuffing and snorting among my animals; but what to make of the noise I knew not, except that there was danger at hand. It was starlight, but too dark to see; and raising myself in my blankets and seizing my rifle, I listened with all attention. In a short time, I distinctly heard the lapping of water at the spring, which was about 50 yards distant; and, looking in that direction, beheld 2 spots, like balls of fire, glaring at me. I expected an encounter and prepared myself for it; but the stranger beast unexpectedly, after uttering a low growl, turned and leisurely retreated, as if he did not deign to attack, much less to fear me. I could see that he was of large size—a majestic animal of the Lion genus; but this was all I could see."[33]

"My curiosity, as well as my love of adventure, was so much excited by the sight of the magnificent but unknown beast, that during the remainder of the night I could think of nothing else. My imagination presented me with the picture of an animal whose capture would exceed in interest all the adventures of my previous days; and no sooner was it light in the morning than I started out with Ben and Rambler to follow the track and reconnoitre the country. The trail led us 4 or 5 miles over a rough country, and at last into a gorge—one of the roughest and craggiest places man's eyes ever beheld. The only way I could work through it was by crawling, clambering, climbing, and pulling myself from cliff to cliff, and thus getting along by slow degrees. In among the huge rocks which were scattered all over the country there was here and there a space of soft earth where the prints of the animal's feet were plainly to be seen; and it was by

[32] Big Game Fields, pp. 116–17.

[33] Adv. J. C. Adams, pp. 351–2.

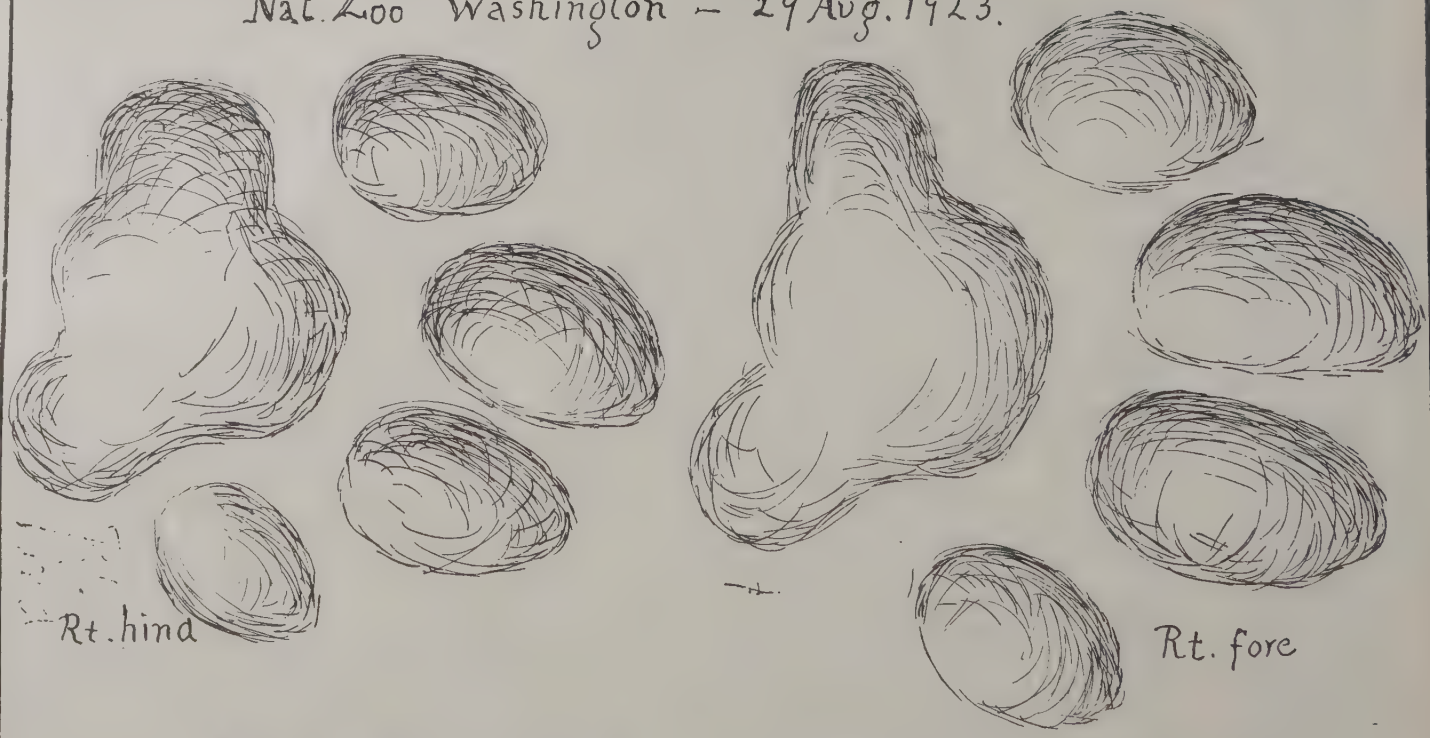

Plate III. Tracks of a small female Jaguar – life-size. – – – –
by E. T. Seton. 1923.

these marks that I pursued the trail into the gorge. Here the marks were better defined; and after following them across the gorge up to the face of a ledge of rocks, I came to a cave, which there was no difficulty in recognizing as the den of the animal.

"The cave was elevated on one side of the cliff, so that a man could with difficulty reach it. In its mouth, and scattered below it, were multitudes of bones and skeletons of various kinds of animals, and among others, of Mountain Sheep, making the place look like the yard of a slaughter house. I endeavoured to reach the cave for the purpose of looking into it, but was unable to do so, and therefore withdrew to consider plans of operations, determined as I was to leave no stone unturned in my efforts to secure the unknown but evidently ferocious animal which made it his haunt. Considering the matter in every point of view, I resolved at last to build a trap on the trail, near the den; but, there being no trees in the neighbourhood, before proceeding further I had to go out and search where I could find timber.

"The country in the vicinity was the roughest that can well be conceived; and it was only with great labour that I was enabled to climb the side of the gorge and pass along the ridge which separated it from another of much the same character."[34]

Having brought timber with great difficulty, he worked all day at his trap, then "went to sleep, but in the course of the night was aroused by a roar, which I supposed to be that of the beast which I was hunting; it was loud but clear, short but piercing, different from any roar I had ever heard; and, as a new fact in regard to the beast, it added to my wonder, for I had already come to the conclusion that the animal was of a different species from any I had ever known. The track was peculiarly large and firm, indicating an animal of great strength and noble bearing.[35]

"There was at this time a new moon, and the gorge, a doleful place even in daylight, was darker than I liked; nevertheless, I could see if any animal passed the trail, and this would be some satisfaction. I therefore watched the twilight pass over the mountains, and saw it grow dusky and at length dark when, overpowered by the fatigues of the day, I curled down by the side of Ben and fell into a slumber. Barely were my eyes closed, however, when a roar roused me and I started up and strained my eyes along the trail from the den to the trap, but could see nothing. In a few minutes the roar was repeated, but in an apparently subdued tone; and directing my eyes in the direction from which it proceeded, I saw a spotted

[34] Adv. J. C. Adams, pp. 353–4–5.

[35] As above, p. 357.

animal, resembling a Tiger in size and form, with 2 young ones. The view was very indistinct, but I could see that the animal was crawling out of the rocks. She went ahead for a little distance, then turned around and appeared to call the little ones, which followed, playing like kittens. My first thought was to kill her and catch the young, and I have often regretted since that I did not take the risks and fire; but I considered that the trap which we had built would be both a safer and more certain method to secure them.

"Remaining silent, therefore, I watched the beasts disappear in the darkness, and neither saw nor heard anything more of them till near morning, when I was aroused by the same masculine roar, which I had heard 2 or 3 nights before. I recognized it immediately, and strained my eyes to see the possessor of that lordly voice. It was, however, so dark that I could not see, though I distinctly heard the tramp of the beast; and it seemed that he was accompanied by his consort and the young ones, which I had seen in the evening. It was evident to me that they had passed near the trap, but they had not entered it; and on examining the tracks in the daytime, I found that they had passed around it.

"Seeing thus that the trap had been passed by, I determined to dig a pit with a falling door; and, accordingly, going to work, in the course of a few days we completed such a trap, 8 feet long, 6 feet broad, and 10 feet deep; and fixed a door over it, swung upon an axle in such a manner as to turn and drop any animal that trod upon it into the pit. The door was covered over with dirt, grass, and leaves in such a manner as to resemble the ground about it, so that I supposed it would be impossible for an animal to detect the deception. I then hung a piece of raw mutton over the door, and retired to my place of concealment, to watch during the night as usual.

"Soon after dark the male animal again made his appearance. As he came to the mouth of the den, he looked around and snuffed the air, and then leaped down, and going a few yards placed his paws upon a rock, and stretched himself, yawning at the same time as if he were waking up out of a sleep. In a few minutes afterward, the female appeared, and approaching, lapped his brawny neck. Pleased with this conjugal attention, the male threw himself upon the ground, and after rolling for a few minutes, stood up, shook himself, and then, with a proud step, trod away toward the traps; and his consort followed him. Their manner toward each other induced the reflection in my mind that nature works much the same in all species of animals; for, even among human beings, I had rarely seen a more expressive indication of conjugal love than was exhibited here.

"The male beast, as nearly as I could see, was twice as large as the

PLATE I.—PHOTOGRAPHS OF FEMALE JAGUAR
National Zoo, Washington, 1923, by E. T. Seton

PLATE V.—"OLD ONE-FANG" AT BAY

Photograph at 15 feet, by John M. Phillips of Pittsburgh, Pa.
This is believed to be the only photograph ever taken of a live Jaguar
in its native wilds. Taken near Tampico, Mexico, Dec. 21, 1910

ordinary Cougar, and appeared to be covered with dark round spots of great richness and beauty. His mien was erect and stately, and so majestic and proud in bearing, that it was with pleasure I contemplated him. As he approached the pit, my heart fluttered; now, thought I, is the time of my success; but, alas, for my hopes! the animals, when they reached the place, evidently suspected something wrong; and, after smelling about suspiciously, made a circuit and passed on. They next stopped at the trap which they appeared to examine attentively; they even entered it, and I strained my eyes to see the doors fall; but, no, alas, for my hopes again! the animals came out and went off, without disturbing the bait, and soon disappeared over the ridge. I watched the remainder of the night but neither saw nor heard anything more of the beasts.

"For several weeks after this time I continued making all endeavours to trap these animals. I caught live bait and tried to inveigle them with the choicest morsels, but all in vain. On several occasions, subsequent to those mentioned, I obtained a sight of the animals, but only a passing one; and at last, confident that it would be impossible to trap them, I determined on the first opportunity to shoot. The male I never afterward saw; but the female and her cubs I unexpectedly came across one day in a gorge far removed from the one containing the den. Ben and Rambler were with me at the time; and, as I fired upon her, they bounded forward and engaged with her in a terrific combat, but she tore them dreadfully, and managed to escape. Poor Ben was so badly injured in the encounter as to require my surgical care and assistance for a week or more afterwards; but though I hunted and hunted, I could find no more trace of the beasts or of any animals like them. I was, therefore, not able then, nor am I able now, to pronounce with certainty upon their character. If they were not Jaguars which had strayed up beyond the usual range, I know not what to call them."[36]

Food Habits

In its Texan range the Jaguar feeds on turtles, fish, turkeys, Peccaries, Deer, Cattle, and wild Horses; in Central and South America it adds to this list Agoutis, Capybaras, Tapirs, and Monkeys; and there can be no doubt that it preys on every kind of large animal that it can find and master. This, of course, makes a full list of all the quadrupeds, birds, fish, and reptiles of considerable size found on its range.

It prefers, indeed, the biggest game, for it is gifted with tremendous

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[36] Adv. J. C. Adams, pp. 358–61.

strength, as well as courage and ferocity. Azara tells of one dragging a Horse carcass for 70 paces, then across a river and into the far woods.[37]

Humboldt records their carrying off the swine of the natives, but says that, nevertheless, they were less of a menace than the Bats, by which he means the blood-seeking Vampire Bats that bleed the Cattle so mercilessly and so insidiously that human vigilance is completely set at naught. "Great numbers perished in consequence of wounds made by the Bats."[38] E. A. Goldman says: "At Chepo, I learned that wandering Jaguars periodically kill Cattle ranging on the savannas between that point and the city of Panama."[39]

Like its cousin the Cougar, the Jaguar seems sometimes to make the dietary error of lunching on Porcupine, for Azara mentions having seen spines of the Couiy, or South American Porcupine, in the Jaguar's excrement.[40]

It seems to be a rule that none of the tropical Cats have any fear of water. It is well known that all of the felines love to be warm. They have not the fur to resist the wet, so in cold regions avoid the water. The Jaguar in its equatorial home is credited with many aquatic ways. It will swim rivers of any width when they lie across its path. It will dash into the water to attack an enemy, and is said by many observers to be an adept at catching fish.

Azara's description of this handsome creature playing fisherman is picturesque and probably true, if we explain the saliva bait as accidental rather than part of the plan. He says: "The Jaguar frequently goes into the water a little way, and there discharges some saliva, which attracts the fish, which greedily snap at it, when the Jaguar, who is very fond of them, by a stroke of his paw tosses them on the bank."[41]

Its far-prowling habit in search of food is thus set forth by Nelson: "Few predatory animals are such wanderers as the Jaguar, which roams hundreds of miles from its original home, as shown by its occasional appearance within our borders. In the heavy tropical forest it so commonly follows the large wandering herds of White-lipped Peccaries that some of the Mexicans contend that every large herd is trailed by a Tiger to pick up stragglers. Along the Mexican coast in spring, when sea-turtles crawl up the beaches to bury their eggs in the sand, the rising sun often reveals the

[37] Nat. Hist. Para., p. 185.

[38] Pers. Narr., II, p. 267.

[39] Mamm. Panama, Smith. Inst., 1920, p. 167.

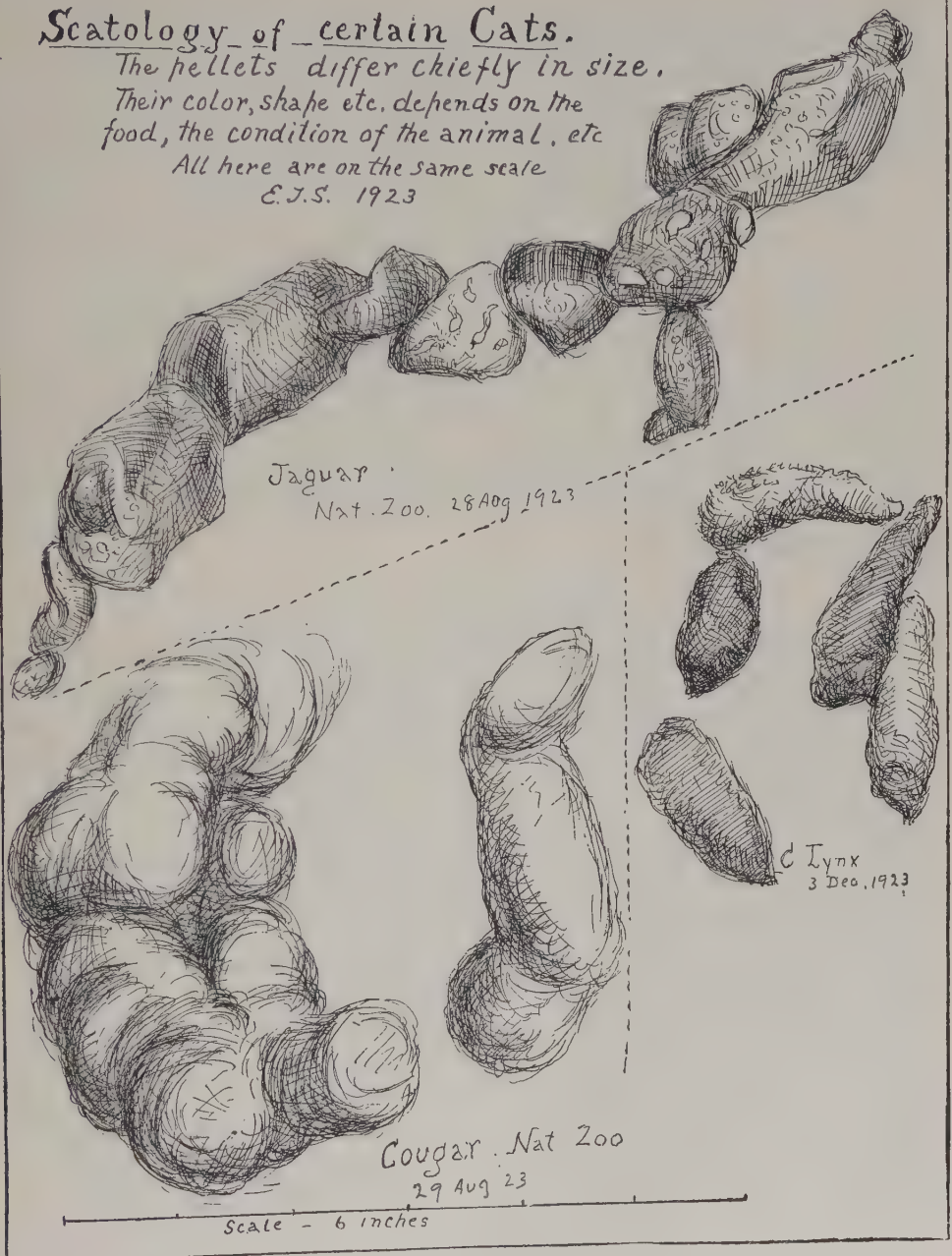
[40] Nat. Hist. Para., p. 185.

[41] As above, p. 185.

Plate IV.

Scatology of certain Cats.

The pellets differ chiefly in size.
Their color, shape etc. depends on the
food, the condition of the animal, etc
All here are on the same scale
E.J.S. 1923



fresh tracks of the Jaguar where it has travelled for miles along the shore in search of these savoury deposits."[42]

J. W. Audubon when in San Antonio, Texas, in 1845, learned much about the then plentiful Jaguars from the Texan Rangers, who were mighty hunters when not proving themselves mighty warriors.

He gives us thus a fine picture of the dignity and conscious force of our spotted King-cat: "When he has finished his meal, he sometimes covers the remains of the carcass with sticks, grass, weeds, or earth, if not disturbed, so as to conceal it from other predaceous animals and vultures until he is ready for another banquet. The Jaguar often lies down to guard his prey after devouring as much as he can. On one occasion a small party of Rangers came across one while feeding upon a mustang. The animal was surrounded by 8 or 10 hungry Wolves, which dared not interfere or approach too near the 'presence.' The Rangers gave chase to the Jaguar, on which the Wolves set up a howl or cry like a pack of hounds, and joined in the hunt, which ended before they had gone many yards, the Jaguar being shot down as he ran, upon which the Wolves went back to the carcass of the Horse and finished him.[43]

Decoying the Jaguar

Most of us have at least a book-familiarity with Moose-calling—that is, luring the animal to destruction by imitating its call notes at the mating time. Other ruminants, as well as birds, are often decoyed in this way, but the Jaguar is the only one of the big Cats that I ever heard of responding to the fateful call of the siren. Nelson's description of the stratagem is as follows:

"In one locality on the Pacific coast of Guerrero I found that the hardier natives had an interesting method of hunting the 'Tigre' during the mating period. At such times the male has the habit of leaving its lair near the head of a small canyon in the foothills early in the evening and following down the canyon for some distance, at intervals uttering a subdued roar. On moonlight nights at this time the hunter places an expert native with a short wooden trumpet near the mouth of the canyon to imitate the 'Tigre's' call as soon as it is heard and to repeat the cry at proper intervals. After placing the caller, the hunter ascends the canyon several hundred yards and, gun in hand, awaits the approach of the animal. The natives have many amusing tales of the sudden exit of untried hunters when the approaching animal unexpectedly uttered its roar at close quarters."[44]

[42] W. A. N. A., p. 413.

[43] Q. N. A., III, p. 5.

[44] W. A. N. A., p. 413.

Attacks on Mankind

To what extent does the superb King-cat commit the crime of crimes, that is, attack mankind?

Unlike the agile Cougar, it undoubtedly takes its occasional toll of our species, and is so amply equipped that only expert hunters fully armed, prepared, and backed by Dogs, have a chance against it in midnight attack.

Azara credits it with a discriminating taste in one of these night raids on a camp. He says it carries off first, by preference, a Dog, then a Negro, then an Indian, and last a Spaniard.[45]

Such exact analysis is probably true of individuals rather than of the species, for the fuller our information, the more we are impressed with the individual variation in body and mind of all great wild beasts.

There can be no question of this, however: The Jaguar occasionally attacks mankind, and is the only American animal that sometimes becomes a man-eater.

Azara says: "Since I have been in Paraguay, the few Jaguars remaining in this country have devoured 6 men, carrying off 2 of them from the midst of companies, who were warming themselves by the fire."[46]

In his South American journey, Roosevelt gives the following account: "The Jaguar, however, has long been known, not only to be a dangerous foe when itself attacked, but also, now and then, to become a man-eater. Therefore, the instances of such attacks furnished me are of merely corroborative value.

"In the excellent zoölogical gardens at Buenos Aires the curator, Doctor Onelli, a naturalist of note, showed us a big male Jaguar which had been trapped in the Chaco, where it had already begun a career as a man-eater, having killed 3 persons. They were killed, and 2 of them were eaten; the animal was trapped in consequence of the alarm excited by the death of his third victim. This Jaguar was very savage; whereas a young Jaguar, which was in a cage with a young Tiger, was playful and friendly, as was also the case with the young Tiger. On my trip to visit La Plata Museum I was accompanied by Captain Vicente Montes, of the Argentine Navy, an accomplished officer of scientific attainments. He had at one time been engaged on a survey of the boundary between the Argentine and Parana and Brazil. They had a quantity of dried beef in camp. On several occasions a Jaguar

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[45] Nat. Hist. Para., p. 186.

[46] As above, p. 186.

came into camp after this dried beef. Finally they succeeded in protecting it so that he could not reach it. The result, however, was disastrous. On the next occasion that he visited camp, at midnight, he seized a man. Everybody was asleep at the time, and the Jaguar came in so noiselessly as to elude the vigilance of the Dogs. As he seized the man, the latter gave one yell, but the next moment was killed, the Jaguar driving his fangs through the man's skull into the brain. There was a scene of uproar and confusion and the Jaguar was forced to drop his prey and flee into the woods. Next morning they followed him with the Dogs and finally killed him. He was a large male, in first-class condition. The only feature of note about these two incidents was that in each case the man-eater was a powerful animal, in the prime of life; whereas it frequently happens that the Jaguars that turn man-eaters are old animals, and have become too inactive or too feeble to catch their ordinary prey."[47]

We have evidence that, like the Wolf and the Grizzly-bear, at one time fearless enemies of man, the Jaguar is now learning the lesson of "guns" and avoids man at any price; whereas in ancient days he was quite ready to face, and even make a meal of him.

The Murderous Jaguar of Santa Fe

One of the most sanguinary and amazing Jaguar experiences on record took place at Santa Fe, N. Mex., a century ago. There can be no question of its accuracy. This Jaguar undoubtedly killed 4 men, but the animal was at bay, unable to escape, and believed itself attacked.

The story appears in the annals of the convent of San Francisco.

His Excellency, Governor J. F. Hinkle of New Mexico, writes me (Oct. 2, 1923) that, according to Col. R. E. Twitchell, the historian, the Convent of San Francisco was situated on the Rio Grande, or Rio Bravo, 18 miles from Santa Fe, at the place now known as Pena Blanca, where its ruins are still to be seen.

The following, an abridged translation from the Spanish, I take from Baird's "Mammals of the Mexican Boundary" (pp. 7–8):

"On April 10, 1825, a lay brother, after having made confession and concluded his prayers, entered the sacristy. There he was terror-stricken on opening the door and seeing himself almost face to face with a Jaguar ('Tigre') of very extraordinary size. In a moment the poor man was in the clutches of the beast, which dragged its victim into a back corner to finish the bloody work.

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[47] Braz. Wild., pp. 31–32.

"The guardian of the convent, on hearing the exclamations in the sacristy, hurried to enter the fatal room, and had scarcely become aware of what had happened when the animal leaped upon his second victim and despatched him with the same promptitude as the first.

"After a while several other men attempted to enter the bloody sacristy, but not without meeting a similar fate, for the first one opening the door was immediately slain.

"A senator, Mr. Iriondo, being present, tried now to approach the sacristy by an adjoining back room which communicated with the former by a small door. The Jaguar, however, had left the sacristy in the meantime through that very door which Mr. I. wanted to use, and before the latter, followed by a small crowd, could enter it, he heard cries, 'Here he is! here he goes! save me!' With this the roaring of the Jaguar was heard, and mingled with it the last exclamations of a fourth victim. Each party now retired, the convent people to the church and the Jaguar to where he had chosen his first stronghold.

"Mr. I. now approached and bolted the door of the sacristy opening into the church, making the least noise he could. A hole was then bored through the door, and finally the crowd succeeded in shooting and killing the dreadful monster through the opening thus prepared."

To this Baird adds: "Some explanation is necessary to make more intelligible this almost incredible occurrence. The Convent of San Francisco in Santa Fe is situated upon the banks of the Rio Bravo [now Rio Grande], which, after freshets, occasionally overflows the islands in front of the town. During one of these overflows all the animals living in the thickets upon the island seem to have been driven out; among them the above Jaguar, which made for the Town side, where he entered the gardens of the convent. A low wall only encircles the latter toward the river. From the gardens he entered a small door, accidentally left open, and so came through an old back vestry to the sacristy. At the time his first unfortunate victim entered the sanctuary from the church side the animal was perfectly aware that his retreat was cut off by the river flood, and thus found himself forced to the desperate attack upon a man, which he was likewise compelled to repeat several times."

Curiosity

There can be no question of the fact that all highly intelligent animals are much moved by laudable curiosity—the desire to understand some new strange animal, object, or circumstance.

"The Jaguar," says Humboldt, "like the Wolf of Europe, follows travellers even when he will not attack them—the Wolf in the open fields

and in unsheltered places, the Jaguar skirting the road, and appearing only at intervals between the bushes."[48]

Audubon and Bachman have much to tell on this subject. They say: "The Jaguar has been known to follow man for a long time." Then add details of an inquisitive individual that followed Colonel Hays. He whirled around and saw the Jaguar looking "right in his eye and gently waving his tail." "The skin was so beautiful it was a pleasure to look at it." So he killed it.[49] George K. Cherrie tells me that in Venezuela in 1905, a Jaguar followed him for a quarter mile out of harmless curiosity.

Playfulness

As a final chapter that aims to present a more pleasing conception of the Jaguar than the established picture of it as a monster of unmitigated and bloody ferocity, I recite an incident that Humboldt recorded and apparently accepted for truth:

"Some months before our arrival [in the Orinoco country], a Jaguar, which was thought to be young, though of a large size, had wounded a child in playing with him.

"The facts of this case, which were verified to us on the spot, are not without interest in the history of the manners of animals. Two Indian children, a boy and a girl, about 8 and 9 years of age, were seated on the grass near the village of Atures, in the middle of a savanna which we several times traversed. At 2 o'clock in the afternoon, a Jaguar issued from the forest and approached the children, bounding around them; sometimes he hid himself in the high grass, sometimes he sprang forward, his back bent, his head hung down, in the manner of our Cats. The little boy, ignorant of his danger, seemed to be sensible of it only when the Jaguar with one of his paws gave him some blows on the head. These blows, at first slight, became ruder and ruder; the claws of the Jaguar wounded the child, and the blood flowed freely. The little girl then took a branch of a tree, struck the animal, and it fled from her. The Indians ran up at the cries of the children and saw the Jaguar, which then bounded off without making the least show of resistance.

"The little boy was brought to us, who appeared lively and intelligent. The claw of the Jaguar had torn away the skin from the lower part of the forehead, and there was a second scar at the top of the head. This was a singular fit of playfulness in an animal which, though not difficult to be tamed in our menageries, nevertheless shows itself always wild and ferocious

[48] Pers. Narr., II, p. 27.

[49] Q. N. A., III, p. 5.

in its natural state. If we admit that, being sure of its prey, it played with the little Indian as our Cats play with birds whose wings have been clipped, how shall we explain the patience of a Jaguar of large size which finds itself attacked by a girl? If the Jaguar were not pressed by hunger, why did it approach the children at all?

"There is something mysterious in the affections and hatreds of animals. We have known Lions to kill 3 or 4 Dogs that were put into their dens and instantly caress a fifth which, less timid, took the king of animals by the mane."[50]

Had Humboldt been equipped with the fuller information that is presented in the Cougar chapter of this work, he would have been led much further in this recognition of the animal's human side. He would doubtless have concluded, as do most modern naturalists, that these, our wild brethren, have the same faculties and emotions as we do, even though in less development. Moreover, they vary as ours do. Sweeping generalizations are useful chiefly in emphasizing the wonderful and variant individuality of these animals.

Enemies

W. H. Hudson has given a remarkable account of the enmity that exists between the Jaguar and the Cougar.[51] Other witnesses substantiate the story. These animals have declared war on each other, and when they meet it is a fight to a finish; and strange to tell, although the Jaguar is bigger, heavier, and stronger, the Cougar is usually the aggressor, and, thanks to his superior agility, is commonly the victor.

There are in current literature many accounts of Jaguars being hunted down and cut to pieces by herds of Havelines or Peccaries. According to some, this valiant little Wild Hog is the most dreaded, fearless, and successful enemy of the big King-cat, but so far I find little foundation for the tales.

The Peccary is the habitual and lawful prey of the Jaguar, and when attacked, adopts the only open and sensible course: he seeks to save his life by headlong flight.

Man is, of course, the implacable enemy of the Jaguar. It is only a question of time now, and maybe very little time, so far as the United States is concerned, before man sends this masterpiece of creation the way of the Dodo, the Auk, the Antelope, and the Sea-cow. One cannot reasonably

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[50] Pers. Narr., II, pp. 267–68.

[51] Nat. La Plata, p. 48.

object, and yet all naturalists regret the ever-widening trail of the exterminator.

Crossing The Divide

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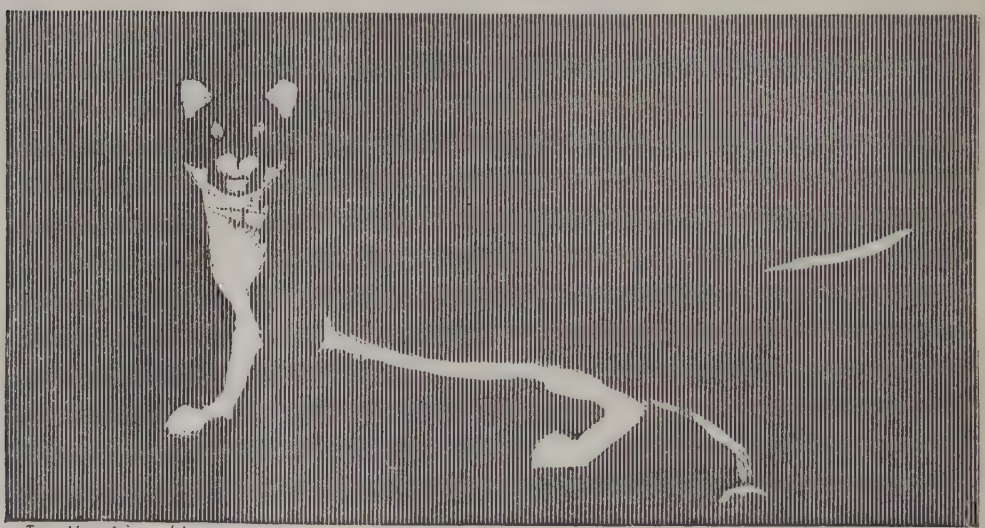

In the fire-light— E. T. Seton

The Cougar, Puma, Panther, Painter, Catamount, Mountain Lion, Brown Tiger, Varmint, Sneak-cat, Red Tiger, Silver Lion, Purple Panther, Deer-killer, Indian Devil, Mountain Devil, Mountain Demon, Mountain Screamer, King-cat

Felis couguar Kerr

(L. *Felis*, a Cat; *couguar*, French contraction of the native American name, *Cuguacara*)

Felis couguar Kerr, 1792, Anim. King., p. 151.

Type Locality—Pennsylvania

Pennsylvania Germans, *Bender*.[1]
French Canadian, *Panthère*, *Couguar*.
S. American Spanish, *Guzuara*, *Puma*, or *Yagüapita*, meaning *Red Yaguar* (Azara). He also gives *Caguar* as a contraction of *Cuguacara* (Nat. Hist. Paraguay p. 213).
Mexican, *Leone*.
Ancient Mexican, *Miztli*.[2]
Ojibwa, *Mishi-biji*, *i.e.*, Big Cat or Big Lynx.
Ogallala Sioux, *Inmu-tanka*, *i.e.*, Big Cat.
Santee Sioux, *Mnaza*.
Cochimies of Lower California, *Chimbica*.[3]
Apache, *Yutin*.
Chilenos, *Pagi*.[4]
Muskogee, *Catsa*.[5]
Mickasaukie, *Coo-ot-cho-bee*.[6]

When seen alive, the great size, brown or gray colour, and the long tail are distinctive of the Cougar. Sad to relate, we have no adequate description of the old Eastern Cougar. I therefore give the measurements, etc.,

[1] Shoemaker: Penn. Lion, p. 18.
[2] Baird: Mamm. Mex. Bd., p. 6.
[3] As above.
[4] As above.
[5] Cory: Letter, Mar. 24, 1920.
[6] As above.

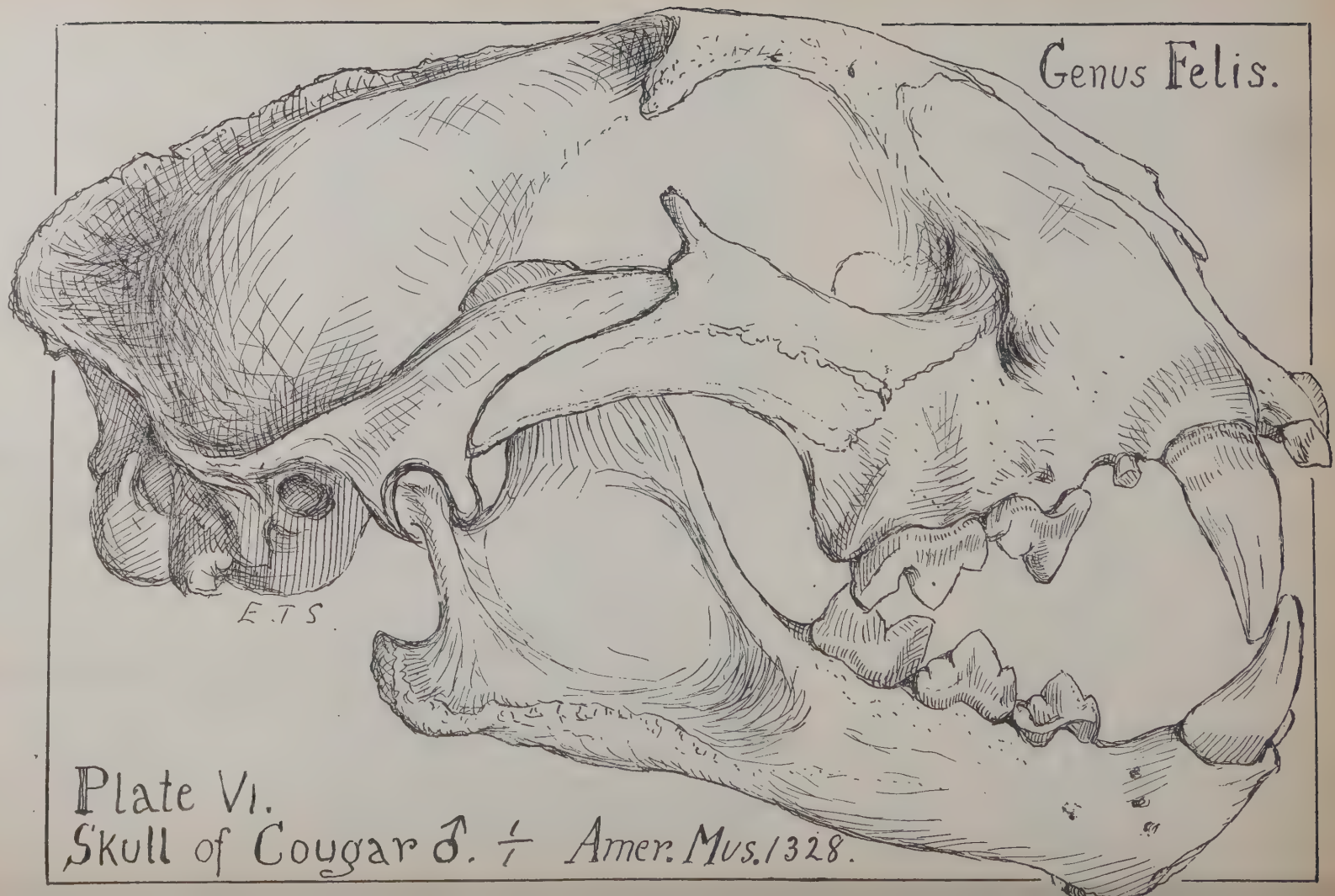

Plate VI.
Skull of Cougar ♂. ⅓ Amer. Mus. 1328.

of the Rocky Mountain creature with the general statement that the Eastern form was somewhat smaller.

To the generic characters it adds the following:

Size. ♂: Total length, 7½ ft. (2287 mm.); of which the tail is about 3 ft. (915 mm.).

♀: Total length, 6½ ft. (1982 mm.), of which the tail is about 2 ft. 8 in. (814 mm.).

The largest ♀ in the Roosevelt collection of 8 adults was 7 ft. long and weighed 133 lbs.; the smallest was 6 ft. long and weighed but 80 lbs.; the others weighed 124, 120, 118, 108, 105, 102.

I find many records of both males and females that show much greater dimensions, but the measurements were apparently taken on the stretched skins.

John Fannin says[7] that of 118 measured by him in British Columbia, one was 7½ ft., ten were 7 ft., the rest below that.

Two medium-sized males taken by Roosevelt in Colorado weighed 164 and 160 lbs. A very large male which he secured was only 8 ft. in total length, though it weighed 227 lbs. For long this stood as the record, but recently a much larger one of probably 300 lbs. has been taken at Hillside near Prescott, Ariz. It was killed by J. R. Patterson, March, 1917.

Concerning this monster, E. W. Nelson, Chief of the Biological Survey, writes me, Aug. 3, 1923: "A letter from M. E. Musgrave contains the following information: 'After the Lion had been killed and skinned, I made a trip to Prescott where I was told of the weight of this Lion. Becoming interested I asked the express agent and several of the citizens of Prescott regarding the weight of the Lion, and they said he had been shipped in from Kirkland to Prescott by express, and that he weighed 276 lbs. after the intestines had been removed.

"'The only measurements I got on the Lion were taken by a man in Prescott and by J. R. Patterson, the man who killed the Lion. He measured 8 ft. 7¾ in. from the tip of his nose to the tip of his tail. . . .

"'I have found since beginning our work in Arizona that Lions run much heavier in Arizona and New Mexico than they do in the northwestern part of the United States that I am familiar with. This, however, I believe, is the largest Mountain Lion that has ever been killed in this State.'"

So that the Hillside Cougar, with its total length of 8 ft. 7¾ in., must stand for the record in size as well as in weight. And it is safe to assume when one is told of 9- or 9½-foot Cougars, that they were not accurately measured. No North American Cougar ever reached such a length.

[7] Forest & Stream, March 6, 1897, p. 184.

African Lions rarely go over 9 ft. The largest Lion taken or measured by F. C. Selous, the African hunter, was 9 ft. 11 in. long in the flesh and weighed 410 lbs.[8]

For lack of material to give a description of the Pennsylvania Cougar, I reproduce that by James E. DeKay in "Natural History of New York State," 1842, Pt. I, p. 47.

Colour. "Body and legs of a uniform fulvous or tawny hue. . . . Ears light-coloured within, blackish behind. Belly pale reddish or reddish white. Face sometimes with a uniform lighter tint than the general hue of the body, oftener with the mouth, chin, and internal angle of the eyes white."

Much more detailed and more nearly topotypic, probably, is the specimen described by Dr. Ebenezer Emmons and ascribed to New York State.

"*Specific Characters.* Colour uniformly dun or fulvous; beneath paler; tail long, extremity dark brown in the male; ears rather rounded and prominent; limbs thick and stout.

"*Description.* The colour of the Puma is remarkably uniform at all seasons of the year. Head rather long; ears light-coloured inside but blackish posteriorly; face whitish about the internal angles of the eyes, upper lips, chin, and the angles of the jaw; hair of the whole body thick and short; tail of the male longer than the female, and darker brown at the extremity."[9]

The usual colour of the Rocky Mountain Cougar is a pale yellowish sandy brown shaded into dull white on the under parts; lips, white, with a dark spot at the base of the whiskers; the back of the ears is dark with a lighter spot in the middle as in most Cats, and the tip of the tail nearly black. This colouring is known as the *red coat.*

It has also a *blue coat* which has no reference to age, sex, or season, and differs from the red only in its general dull *grayish* colour. (It should be noted that most of the Cats have two colours: The spotted Cats, a yellow or black coat, the one-coloured Cats, a gray or red coat.)

The iris is yellow or brown; the pupil is round.

The young are of a yellowish brown with black spots. This spotted coat they wear till they are about 6 months old, when they usually change to adult colours. In rare cases, the spots persist till the middle of the second year, in which coat the Cougar may have been mistaken for a Jaguar. J. Fannin tells of a 2-months-old kitten that had no spots at all.[10]

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[8] Encyclopedia of Sport, II, p. 6.

[9] Quads. Mass., 1840, p. 35.

[10] Forest & Stream, Mar. 6, 1897, p. 184.

Genus Felis.

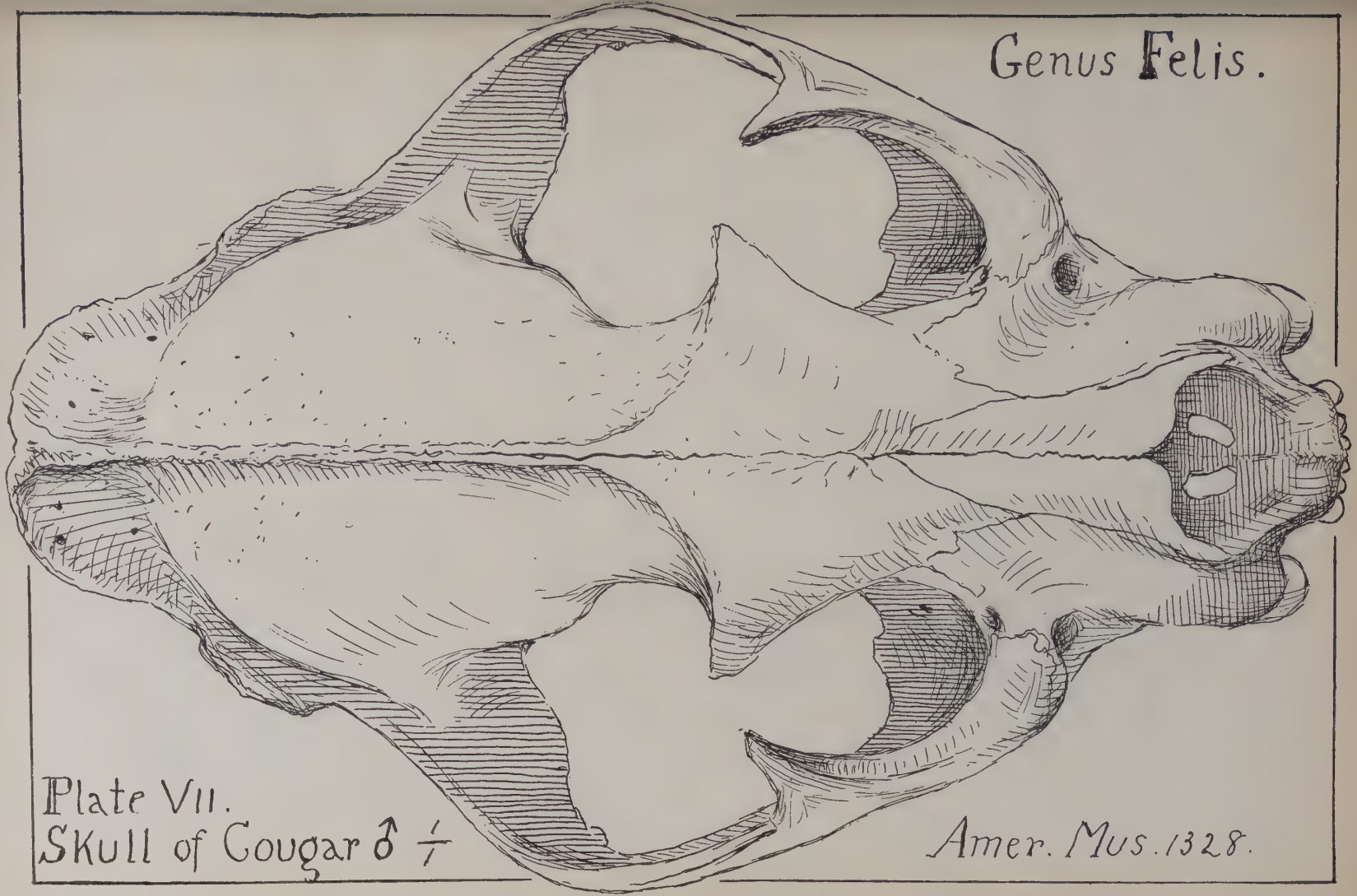

Plate VII.
Skull of Cougar ♂ ⅟₇

Amer. Mus. 1328.

Races

The following North American Cougars have been recognized:

couguar Kerr, the typical form, a middle-sized yellow animal with a small head. T. l., Pennsylvania.

coryi Bangs, a large animal with large head and intense reddish colour. T. l., Brevard County, Fla.

arundivaga Hollister, a large animal like *coryi* but lacking the bright red colour; like *azteca*, but darker and with a dark back stripe. T. l., Vidalia, La.

hippolestes Merriam, very large; largest of all and of pale colour. T. l., Wind River Mountains, Wyo.

olympus Merriam, similar in size to *hippolestes*, but very dark in colour. T. l., Olympic Mountains, Wash.

browni Merriam, a pale gray and smaller race of *hippolestes*. T. l., 12 miles south of Yuma, Ariz.

azteca Merriam, smaller than *hippolestes* and no white beneath. T. l., Colonia Garcia, Chihuahua, Mex.

improcera Phillips, a small animal, smaller than *browni*, but with very large teeth. T. l., Calmalli, Lower Calif., Mex.

S. N. Rhoads considers that all of these North American Cougars are races of one species. For the purposes of life-history, at least, I prefer to accept this view.

In Central and South America, half-a-dozen other forms have been described, including *Felis concolor* Linnæus.

History

Purchas cites Acosta (1590) as authority for the following: "Of the Beasts in America . . . they have Lyons, but not like in greatneſſe, fierceneſſe, nor colour, to thoſe of Africa. . . . The Lyons are gray, and uſe to clime Trees; the Indians hunt and kill them."[11]

This quite accurate notice is the earliest I find for the Cougar.

John Josselyn's meagre account implies only that there were Lions in New England, but that they were extremely rare.[12] In his "Voyages,"[13] he mentions the reported killing by a Lion at Piſcataway, near Cape Anne.

[11] Pilgrimage, 1617 ed., p. 909.

[12] New England's Rarities, 1672, pp. 57–58.

[13] Voyages, 1674, p. 22.

The name "Lion," applied by the early explorers, led the historians to look for a creature with a mane. The maneless skins were assumed to be the females; hence, the following:

Adriaen van der Donck writes: "Although the New-Netherlands lay in a fine climate, and although the country in winter seems rather cold, nevertheless Lions are found there, buc not by the Christians, who have traversed the whole land wide and broad and have not seen one. It is only known to us by the skins of the females, which are sometimes brought in by the Indians for sale; who on inquiry say, that the Lions are found far to the southwest, distant 15 or 20 days' journey, in very high mountains, and that the males are too active and fierce to be taken."[14]

[14] A Description of the New-Netherlands, 2d edition, 1656. Coll. N. Y. Hist. Soc., I, 1841, p. 167.

Range of the Cougar with Map

The north line on the map gives the limit of its regular range, the spots are the interesting or extra-limital records cited herein.

Those who have worked on this subject will miss a number of long-current records. They were omitted because investigation proved them erroneous.

The South American species, including *Felis concolor*, are omitted.

In its various forms the Cougar ranges in the half wooded or rugged country from about N. lat. 50° southward over the North American continent, Central America and South America as far south as the Strait of Magellan. Thus it has the most extended distribution of any of the great Cats, covering more than one hundred degrees of latitude. The map indicates sufficiently the range in North America.

Dr. F. W. True in his paper on the Puma (1891) gives records for every State in the Union except New Hampshire, Rhode Island, New Jersey, Delaware, and Nevada.

These gaps are filled for the United States by S. N. Rhoads' New Jersey records,[15] C. H. Merriam's for Rhode Id.,[16] Stone & Cram for New Hampshire,[17] J. C. Adams for Nevada.[18] And since Delaware is surrounded, it surely was at one time inhabited by the species.

Thus it is clear that in primitive times the Cougar inhabited every part of the United States in which there was some cover and a sufficiency of food the year round. I have outlined the normal range; that is, the area of general distribution, and will refer in detail to those occurrences only which are beyond that, beginning at the extreme east.

[15] Mamm. Penn. & N. J., 1903, p. 132.

[16] Wash. Acad. Sci., Dec. 11, 1901, p. 577.

[17] Am. Anim., 1902, p. 290.

[18] Adv. of J. C. Adams, p. 246.

MAP IV. RANGE OF THE COUGAR IN NORTH AND CENTRAL AMERICA

By E. T. Seton, with assistance of the Biological Survey, 1923

A hundred years ago, the Cougar was found throughout America up to the line across southern Canada and the northern tier of States. In 1920 it was extirpated in the untinted areas of this region. It was occasionally found in the pale gray area and was a not uncommon inhabitant of the dark gray.

The black dots are interesting records discussed in the text.

Interesting Records in Canada

Nova Scotia and Prince Edward's Island

I can find no evidence of Cougar ever having been found in Nova Scotia or Prince Edward's Island.

New Brunswick

After a careful examination of all the available records, and there are a dozen or more, I am obliged to agree with Prof. W. F. Ganong "that there is not a solitary authentic record, or any other authentic evidence, of either the present or former occurrence of the Panther within the limits of New Brunswick."[19]

Quebec

Sherbrooke. About 30 years ago, in the collection of the Honourable Geo. W. Allen of Toronto, I saw the skin of a Panther which he said had been killed near Sherbrooke, Quebec, about 1840.

P. H. Gosse gives a very circumstantial account of a Cougar being killed in Bolton township near Sherbrooke about 1825.[20]

Quebec City. Dr. A. Leith Adams, as already noted, refers to a Panther skin from the vicinity of Quebec.[21]

Megantic. "Regarding a Panther being seen in Bennington County, Vt. From my earliest recollection, over sixty years, there have been Panthers in northern Vermont and in the adjacent counties of Quebec, the Megantic district and the Brompton Lake and Oxford Mountain Woods."[22]

Ottawa River and Lachute. W. P. Lett of Ottawa writes of the Panther: "It abounded, at one time, in the valley of the Ottawa in considerable numbers.

. . . . . .

"The Cougar . . . in the glass case . . . measured $7\frac{1}{2}$ feet from nose to end of tail. He was shot by a boy named Bentley, upwards of

[19] Paper read before the Nat. Hist. Soc. of New Brunswick, Jan. 6, 1903.

[20] The Canadian Naturalist, 1840, p. 39.

[21] Field & Forest Rambles, 1873, p. 59.

[22] N. P. Leach, Forest & Stream, Sept. 11, 1909, p. 412.

40 years ago, on Croil's Island, on the south side of the St. Lawrence River, opposite Farran's Point, about 10 miles east of Morrisburgh, with an iron spike or nail. The youth killed the animal with a single shot, a sporting exploit sometimes found difficult of accomplishment by experienced hunters.

"About one hundred years ago the Panther was found in every part of [southern] Ontario and Quebec. I have been assured, by reliable authority, that about forty years ago (1847) two large specimens were frequently seen near the Village of Lachute, in the Province of Quebec.

. . . . . .

"On two or three occasions, many years ago, I heard in the thick forest near the Village of Richmond, and afterwards in the Township of Huntley, some strangely startling and frightful screams, which I attributed to the Cougar. Be this as it may, I have heard no screams of the same kind for the last 30 years."[23]

Sorel. "The following was handed to the writer by H. R. Gray, Esq., of Montreal, just previous to going to press. 'On October 3d, 1863, as Jacques Gamelin of la Baie Lavallières, or St. Francis, on the River St. Lawrence, and two other men, were proceeding in a *bateau* to Sorel, C. E., being at the time about four arpents (acres) from land, they were suddenly attacked by a large Panther which swam off and succeeded in laying hold of the boat. Not having firearms or other defensive weapons on board, they were obliged to resist the attack with a boat-hook and oars, and after a lengthened struggle, during which the animal displayed great obstinacy combined with strength, he was killed, but not before he had succeeded in getting his powerful forepaws on deck; not being able to make his accustomed spring, in consequence of his hind-quarters being under water, he was incapable of injuring either of the men. He fell into the possession of, and was stuffed by, Mr. Craig the well-known taxidermist.' Its weight was 131 pounds and it measured 3 feet from tip of the nose to the root of the tail."[24]

Ontario

St. Catherine. Major W. Ross King says:[25] "I have only seen in Canada one specimen of the Puma (*Felis concolor*) and that was shot a few miles from St. Catherine by Doctor Maitland, R. C. R."[26]

He adds: "It is a most destructive enemy to Sheep, killing sometimes

[23] Ottawa Naturalist, I, p. 127, 1887.

[24] H. B. Small: Animals of N. A., 1864, p. 49.

[25] Sportsman and Naturalist in Canada, 1866, p. 16.

[26] As above, p. 17.

scores in a single night in apparent wantonness, and on this account has always been systematically hunted down by the farmers, so that it is not to be wondered at that it should have so greatly diminished in numbers in Canada of late years that at the present day it is only found in the largest tracts of wood, and at rare intervals."

Audubon and Bachman saw "a specimen procured in upper Canada"[27] and state[28] that it "is found sparsely distributed over the whole of North America up to about lat. 45°" which implies that the above specimen was from the Ontario Peninsula.

Near Temiscamingue. Thomas Anderson, Hudson's Bay Company's Chief Trader, told me in detail (1907) of a Cougar occurrence in northern Ontario in the fall of 1879. Ogushen, a well-known and reliable Indian, found tracks of a large Cat at Lac des Quinze. He saw them all winter on South Bay of that lake. One day he came on the place where it had killed a Caribou. When he returned the following March he saw the creature and it came toward him. It was evidently a Cat longer than a Lynx and it had a very long tail which swayed from side to side as it walked. He shot it dead, but feared to go near it believing it to be a Wendigo (*i.e.*, an embodied evil spirit). It had a very bad smell. Anderson says it was undoubtedly a Puma, but it was unknown to the Indian. Ogushen was a first-class hunter and was telling the truth, as Anderson firmly believes. Lac des Quinze is 15 miles north of Lake Temiscamingue.

Scarboro. In the *Biological Review* of Ontario, for April, 1894, vol. I, no. 2, p. 18, the Rev. John Doel of Toronto tells of a fine large Panther that was shot in the township of Scarboro, northeast of Toronto, Ont., prior to 1820. The specimen was among his father's possessions for some years, till in 1843 it was lost in a fire. It was 6 feet 10 inches in total length, of which the tail was 2 feet 3 inches.

Toronto. Doel also tells of a man named Burkholder having a fight with a Panther on Baldwin's Hill (now in the city of Toronto), in 1826.

Thornhill. He records further that a woman at Thornhill, 12 miles north of Toronto, saw a Panther in her garden one morning about 1854. Afterward it was followed all day by hunters who saw it several times but failed to get it.

Crosby. According to the same authority, about 1847 one Thomas Leggatt of Crosby township, County of Leeds and Grenville, met a Panther in the woods. In fall of the next year John Singleton of the same place heard the animal's yells, and later saw a large yellow creature with a long

[27] Q. N. A., II, p. 312.

[28] As above, p. 307.

tail pursuing his Dogs. After that it killed his "Pigs, Sheep, and young Cattle." It was seen several times and fired at, but not secured.

Ops. In 1853 the Rev. John Doel was told reliably of a recent adventure with a Panther in Ops Township, Victoria County (60 miles northeast of Toronto). It was several times seen and hunted, but escaped.

Cobourg. John Calcutt in the publication cited above (p. 23), tells of Dr. James Pringle coming into the town of Cobourg (about 1838) with an account of a Cow just killed and dragged off by a Panther in the woods near by. The exploits of the animal and the many futile hunts after it are given in full detail, but the animal eluded all pursuit. It was probably accounted for at Grayton (see below).

Grayton. During the hunt after the Cobourg Panther mentioned above, abundance of tracks and killings as well as Panther yells were noticed. Then a resident reported the presence of fresh traces on his farm, and described the terror they inspired in his hounds. A new hunt was proposed. "While waiting to fix upon a convenient day and collect a party, news arrived that a couple of Panthers had been shot near Grayton a few miles further on. This settled the question. There were no more doubts as to the species of animals the marauders belonged to, for there they were, veritable American Panthers."[29]

Whitchurch. Dr. William Brodie gives full details of a Panther that prowled in the woods of Whitchurch, Markham, Uxbridge, and Pickering in the years 1839 to 1843, killing and dragging off Sheep, Pigs, and young Cattle.[30] It was seen at short range by Andrew Bullinger in the midsummer of 1839, and soon after by Daniel Baker, both of them accounted reliable men, as well as hunters, knowing all the common animals of the woods.

All of these eight records group themselves about Toronto.

Ottawa. "Rare. One large specimen was killed north of the city of Ottawa. This is the only record of the occurrence of this animal in Canada."[31]

Manitoba

Makinak. In Aug., 1904, N. C. Nead, the taxidermist at Dauphin, Manitoba, assured me that a Mountain Lion or Cougar was killed two or three years ago at Makinak where it had been preying on calves. "W. F. White, the taxidermist of Winnipeg, saw, or maybe got the skin."

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[29] John Calcutt, about 1838, reference above

[30] As above, p. 27.

[31] William Couper: Notes on Mammals of Canada, Forest & Stream, June 14, 1877, p. 300.

Riding Mountain. "There is said to be another in Riding Mt. now."[32]

Plum Coulee. At Brandon in Sept., 1904, C. C. Helliwell, the naturalist, stated to me that the Cougar or Deerkiller is undoubtedly found in Manitoba. Several have been killed in the Province. One was taken on Plum Coulee in the Souris Country in 1887 and commented on in all the Winnipeg papers. It had been killing calves and hogs. He himself followed its track for some way and found where it had stalked a Jackrabbit, crawling along a ditch, and at one place had stood erect on its hind-feet to look for the Jack.

Oak Lake. Another he says appeared at Oak Lake about 1892. It was seen by several persons but never killed.

Brandon. At Winnipeg, in 1904, Shaw Cottingham, the sportsman, told me that he has seen the skins of two Cougars killed in Manitoba. They were on exhibition at Carruthers' Store in Brandon.

Elphinstone. Dr. Gordon Bell of Winnipeg tells me that another was killed at Elphinstone, Riding Mountain, in 1904.

Swan Lake. According to the Winnipeg papers of May 10, 1905, an Indian named George Beattie, while out hunting near Swan Lake "last Friday," came across the track of an abnormally large Lynx, and on following it got a glimpse of a Puma but failed to get a shot at it.

All of these records are from the hilly region where Deer abound, and have in their favour the fact that they were made by expert hunters and taxidermists who are very familiar with the Lynx, but so far, I have not been able to see even a piece of hide or other material evidence of a Cougar taken in Manitoba. All the possibilities are favourable, and it is generally understood that the Tiger Hills in southern Manitoba and the Tiger's Head in the northwest were named after Cougars that frequented them.

Alberta

Crow's Nest. Geo. F. Dippie, the naturalist and taxidermist at Calgary, tells me that the Cougar is quite common at Crow's Nest Pass. He has a specimen taken just west of High River in the fall of 1909.

Panther Creek. A little north of Banff, about lat. 52° N., on the east slope of the Rockies, is Panther Creek, an affluent of the Red Deer, named after this species.

Banff. J. W. Milne, a Government Surveyor of the Bow River in western Alberta, 1883–84 met with a party of men in the summer of 1884 at the mouth of the Cascade River (Banff). They were greatly excited because they had just encountered a "pair of Mountain Lions."

[32] N. C. Nead, personal information.

Morley Mission. The son of Rev. McDougall, the Methodist Missionary, killed a very large Panther (8 feet in length).[33]

Kananaskis. In the autumn of 1884, J. W. Milne met with a Cougar on Morley Indian Reservation within a mile of Kananaskis River. He was roused by the cries of the animal. He is not sure that he saw it but found abundance of the unmistakable tracks in the snow the next morning. In the same region later one of the axemen had a clear view of the Cougar.[34]

Little Buffalo River. In the fall of 1907, when I canoed on the Athabaska River, my native guide Elzear Robillard, a man of intelligence and some education, told me that in 1902 an Indian hunter on Little Buffalo River killed a large animal that he called a "Lion." It was all liver-brown in colour and had a long tail with a brush on the end of it.

The river in question is a small tributary of the Athabaska flowing in on the west at about 56½° N. lat.

Athabaska River. "J. S. Edmonton reported seeing the tracks of one, on two occasions, near Boiler Rapid and Grand Rapid on the Athabaska, one winter during recent years, he thinks in 1897."[35]

British Columbia

Beavermouth (on C. P. R.). J. W. Milne, the surveyor—already quoted—gives a full account of several times seeing Panthers on the eastern edge of the Rockies at lat. 51° 30′, long. 117° W. and other near-by places, in the summer of 1883.

After giving the cases cited above and some hearsay evidence as to range, Milne says: "The northern point must be between lat. 52° and 56°. Possibly the Panther may be found on the head waters of the Athabaska in the neighbourhood of Yellow Head Pass near Mounts Brown and Hooker. Hunters and traders on the British Columbia side of the mountains report it is fairly common."[36]

Phillips' Peak. Dr. W. T. Hornaday gives records from Elk River Valley, Sulphur Springs, and Pass Creek in British Columbia, and after many inquiries, fixes the north limit of the Cougar as Phillips' Peak which is lat. 50°, long. 115° W.[37]

West Coast. According to John Fannin (and many other naturalists)

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[33] Christian Guardian, 1894, Toronto.

[34] Biol. Rev., Ont., Oct., 1894, vol. I, no. 4, pp. 81–83.

[35] Preble: Athabaska Mackenzie Region, N. A. F. 27, 1908, p. 208.

[36] Biol. Rev., Ont., Oct., 1894, vol. I, no. 4, pp. 81–83.

[37] Camp Fires in the Canadian Rockies, 1906, p. 304.

it is quite plentiful over all of Vancouver Island and on the mainland. "It is found but sparsely east of the Cascades to about 52°."[38]

In British Columbia, according to Fannin,[39] during the years 1890–96, 610 Panther bounties were paid. The annual numbers were 47, 71, 89, 122, 115, 166, showing a steady increase. But many more were killed, because sportsmen do not claim the bounty since it entails the mutilation of the skin.

In the same Province in 1914, 280 Cougar bounties were paid, according to the report of Consul-General R. E. Mansfield.[40]

Peace River Valley. The northmost record for the continent is sent me by Provincial Constable E. Forfar, of Hudson's Hope, dated Oct. 10, 1922. He says: "The Mountain Lion whose skin is in my possession was killed sometime in November, 1921, by a Beaver Indian named Dan. He was hunting Lynx with Dogs when the Dogs treed the Lion. Dan shot it with a .22 rifle, not knowing what it was. He asked me when he brought in the skin if they were dangerous. It was killed near the mouth of Cypress Creek, a branch of the Halfway River, the Halfway being a tributary of the Peace River, about 80 miles in a northerly direction from Hudson's Hope.

"The Lion was a mature male. The cased skin measures exactly 8 feet. Body measurements I have been unable to obtain. There were rumours of another one in the locality. This I have been unable to authenticate."

Forfar showed the skin to John A. Dresser, mining geologist of Montreal, who reported it to me, and added: "Other traces of this animal are recently reported from the vicinity of the Peace."

E. A. Preble tells me that his Liard River records must be withdrawn as errors.

[38] Nat. Hist. Br. Col., 1898, p. 8.

[39] Forest & Stream, March 6, 1897, p. 184.

[40] As above, Aug., 1915, p. 493.

Interesting Records in the United States

Maine

Norcross. Charles H. Daisey, the well-known guide of Camp Phœnix on Sourdnahunk Lake, about 50 miles from Norcross, was coming to the latter place early in the fall of 1907, when he met two Panthers and wounded one with his revolver, but it got away. He saw their track before and after the encounter and has no doubt that they were Panthers.

A Panther was seen in the neighbourhood later in the season by Frank Haskell, who followed the track a long way, accompanied by Capt. Robert Sawyer, but nothing further was seen of the animal.[41]

Baldwin. G. T. Ridlon recounts the killing of a Panther in Maine at Baldwin, but does not give the date.[42]

(See "New Hampshire Mammals," by Jackson, *Journ. Mamm.*, Feb., 1922, p. 13, where he refers to *American Field*, LXVI, p. 400.)

New Hampshire

Lee. About 1865 a "real Cougar" was shot between Lee and Epping, N. H., by a man who was out gunning in that town. He saw the creature on a big limb about 16 feet from the ground at short range. He fired a charge of bird-shot into its head, putting out both its eyes. After a terrible struggle, it died. He had the skin mounted.[43] To this Shaw adds: "When I saw it, it was in the basement of the First Methodist Church in Exeter. It was 3 feet high and about 9 feet long, including the tail."

Prof. C. F. Jackson, State College, Durham, N. H., writes Jan. 19, 1922: "This is absolutely authentic, as this splendid specimen is still in existence."

"In 1885," says Jackson further, "a specimen was taken in the White Mountains, which is the latest record I have for the State. Rumours have been heard from time to time of the Cougar occurring in Maine and in the Green Mountains of Vermont.

"Dr. E. W. Nelson, of the Biological Survey, has referred me to 2 records, one from Vermont and one from Maine. The latest Vermont record is furnished by Merriam in the Proc. of the Wash. Acad. of Sci.[44]

[41] Forest & Stream, June 27, 1908, pp. 1011–1012.

[42] Saco Valley Settl. & Fam., 1895, p. 402.

[43] Letter from Wear N. Shaw, of Kensington, N. H., to W. E. Cram, Jan. 19, 1915.

[44] 1901, p. 582.

"According to this record, the last one killed was in 1894. . . .

"It is not known whether the 2 Panthers referred to above are male and female, although this is probably the case. One was seen at very close range by Mr. H. T. Woodward of Berlin and was thought by him to be a male."[45]

Massachusetts

East Douglas. Under the heading "Mysterious Monsters," a correspondent sends a circumstantial account and a very exact description of a Panther which prowled around East Douglas, Mass., about Feb. 4, 1883. But no one got a shot at the animal.[46]

Vermont

In Vermont the Cougar has been of general occurrence and may linger even yet (1920). Zadock Thompson, after giving an accurate description of the animal under the name "Catamount," and indicating the range, says: "They were formerly much more common in Vermont than at the present day, and have at times done much injury by destroying Sheep and young Cattle."

Bennington. Dr. Samuel Williams, under the name "Catamount," describes fully and accurately the Cougar, stating: "Some years ago, one of these animals was found at Bennington," and killed after a lively encounter with Dogs. "These animals," he says, "have been often seen in Vermont; but they never were very numerous or easily to be taken."[47]

"Some years ago, one of these animals took a large calf out of a pen at Bennington."[48]

Roxbury. "One of the largest taken in this State, to my knowledge, was killed in Roxbury in Dec., 1821. It measured 7 feet from the nose to the extremity of the tail, and weighed 118 pounds."[49]

Manchester. On page 12 in the 1853 Appendix of his "Natural History of Vermont," the above author, after minutely describing an 86-pound male, says:

"The Panther here described was caught on the western slope of the Green Mountains, in the town of Manchester, Bennington County, on the 5th day of Feb., 1850." It was taken in a Bear trap by one Burritt. It had

[45] Jackson: New Hampshire Mammals, Journ. Mamm., Feb., 1922, p. 13.

[46] Forest & Stream, Feb. 15, 1883, p. 48.

[47] History of Vermont, 1794, pp. 86–87.

[48] Nat. Hist. Vermont, 1853, p. 37.

[49] As above, p. 38.

Plate XII.
Cougar Studies
by E.T.Seton

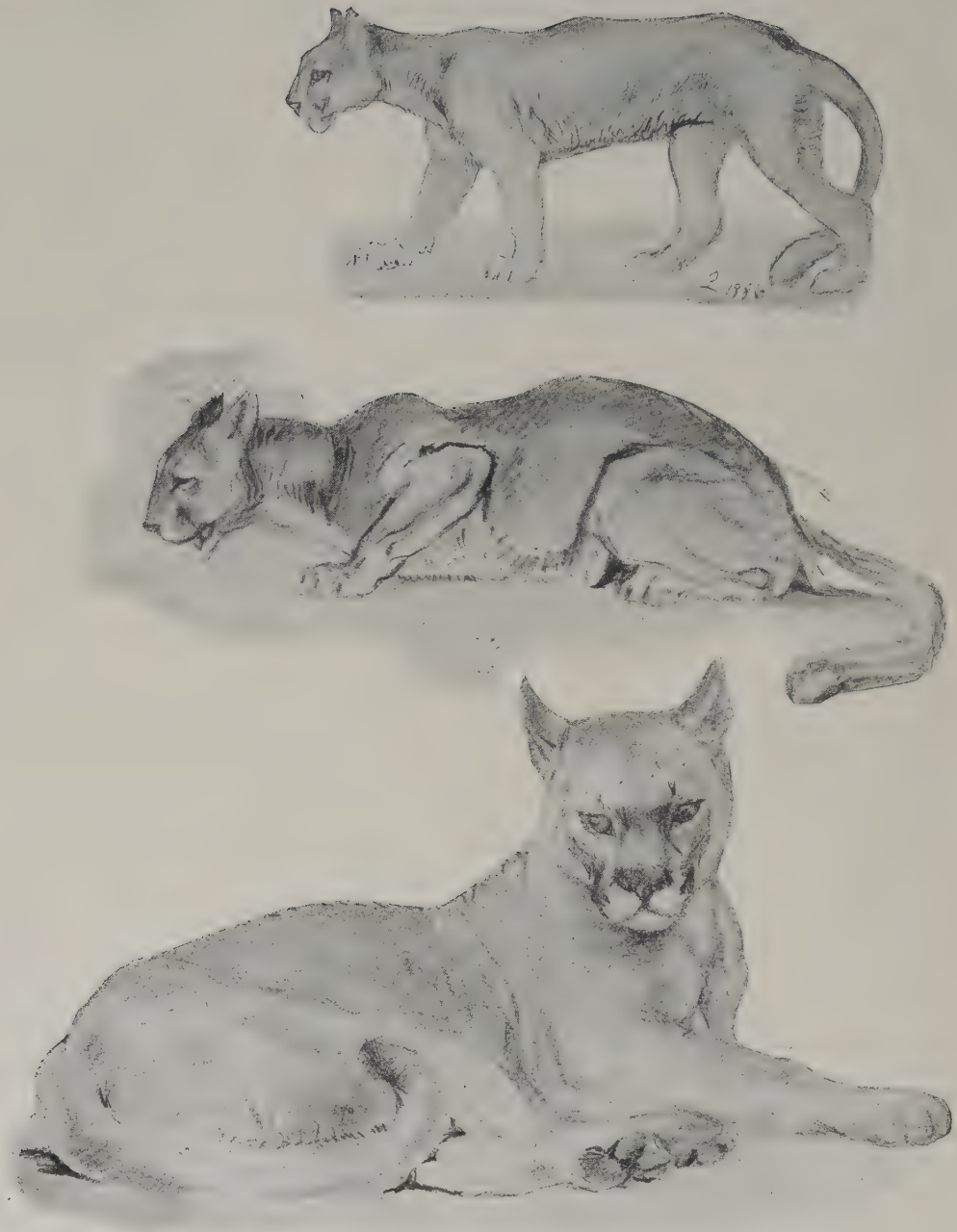

PLATE XIII.—COLORADO COUGARS
By E. T. Seton, 1886, 1889

suffered days of starvation, hence its light weight. The skin was presented to the Museum of the University of Vermont, where it now is. Its forequarters were much filled with Porcupine quills. "This was the last and the only one which has been, to my knowledge, killed in Vermont for years."

Wardsboro. On Nov. 20, 1875, a Panther was killed at Wardsboro, Vt. The specimen is now in the Museum of the Boston Society of Natural History, where I saw and examined it Feb. 10, 1921. The following note apparently refers to the same animal.

West Wardsboro, Nov. 29, 1875. "A few days since, a Panther track was found and followed by fifteen men and some Dogs. They found the place where the creature had killed and eaten a Porcupine, and later, the Panther itself was discovered up a tree. It was killed after a lively fight. It weighed 105 pounds, and measured 7 feet from tip to tip."[50]

Brattleboro. The Rev. S. W. Powell writes from Wilmington, Vt., in the *Evangelist:* "One [Panther] that weighed 180 pounds was killed a year or two ago, I was told, and shown at Brattleboro."[51]

Weathersfield. "A few months since the writer saw another [Panther] that was captured on Pine Hill, in Weathersfield, Vt., Jan. 31, 1867. This specimen is said to have measured 7 feet from the tip of the nose to the tip of the tail, to have stood 2 feet 9 inches high, and to have weighed 122½ pounds. It had lived for some time previously on Ascutney Mountain, a few miles from where it was captured. Very good photographs of this rare animal taken from this specimen before it was skinned, can be obtained of Mr. J. D. Powers, of Springfield, Vt."[52]

Andover. During the fall of 1891, according to a Brattleboro newspaper, two men, while hunting ruffed grouse in the town of Andover, suddenly came upon a Panther, into which they emptied several charges of shot, apparently without serious result.[53]

East Enosburg. "Two years ago [1907] this summer, I saw a Panther track in East Enosburg, Vt., and about that time a farmer in that neighbourhood clubbed or stoned two of these animals away from a Deer.

"Up to 20 years ago, there were in that territory more Panthers than Bobcats, but now there are far more of the latter. Formerly the big Cats lived almost exclusively on Hedgehogs and the Great Northern Hare, and very seldom molested either Cattle or Sheep. We have the same animals here [Pasadena, Cal.] but we call them Mountain Lions. The Vermont

[50] S. W. G. [Sam. W. Goodridge] of Grafton, Vt.: Forest & Stream, Dec. 16, 1875, p. 300.

[51] Forest & Stream, Nov. 12, 1885, p. 306.

[52] J. A. Allen: Mamm. Mass., 1869, Bull. Mus. Comp. Zoöl., I, 1863–69, p. 153.

[53] Rev. Pumas, p. 582.

Cats are larger than those found here, as I have not seen any tracks as large as those seen in Vermont."[54]

Barnard. In Vermont apparently the Panther has been of regular occurrence though "it has never been abundant." Hon. John W. Titcomb, in his account of the animals of Vermont, gives the above, and states that the bounties paid show Panther to have been killed in the State in 1866, 1870, 1875, 1894. In the State Museum of Montpelier is a large Panther that was killed by Alexander Crowell in the town of Barnard, Nov. 24, 1881. It weighed 182 pounds. "Judging from occasional reports," he adds, "there are still a few Panthers roaming our forests."[55]

Sunderland. Harry Chase, County Game Warden, reports that Paul Deming of Arlington saw a large Panther in broad daylight within 25 yards of him near Kelley Stand in the town of Sunderland, July 28, 1909. Harry Chase himself and Warden Lozier corroborate the story as on the night of July 10th they had heard a Panther calling in that same locality.

Again on Aug. 27, Chase spent a week in the region and found the Panther's tracks in several different places about Beebe's pond, while others claim to have seen the animal.

Chase mentions that another (as already recorded) was taken at West Wardsboro some time ago.[56]

Green Mountains. This territory seems to have been the last resort of the Panther in New England. "Prof. Geo. H. Perkins of Burlington, Vt., writes me that Panthers were killed in that State in 1870, 1875, 1881, 1894, and that hunters believe that a few still exist in the Green Mountains."[57]

Rhode Island

In the Boston Society of Natural History Museum is a mounted Panther, marked "from Rhode Island."

New York

The Adirondack Mountains have long been noted as a last stronghold of the Panther. Though now practically exterminated, odd ones are reported. John B. Burnham, Chief Game Protector, says (Aug. 28, 1909): "I have heard from time to time reports of Panthers having been seen in the Adirondacks within the past ten years. Eight or ten years ago Panther

[54] N. P. Leach: Forest & Stream, Sept. 11, 1909, p. 412.

[55] Animal Life of Vermont, The Vermonter, June, 1901, p. 198.

[56] Forest & Stream, Aug. 14, 1909, p. 251; Oct. 2, 1909, p. 534.

[57] Rev. Pumas, p. 582.

tracks were seen in the mountains north of Elk Lake by Pell Jones." In 1888 Burnham saw the carcass of a Deer killed apparently by a Panther, west of Mount Marcy. In the Game Warden's office at Albany is a mounted specimen killed by Verplanck Colvin on Sumner Stream on Feb. 15, 1897. On Dec. 27, 1889, a Panther was killed in the Adirondacks and bounty paid therefor.

In 1894, Game Protector R. B. Nichols saw a Panther on his farm on Cedar River seven miles above Indian Lake Corners. Several other persons saw it plainly by daylight.[58]

Adirondacks. In the last week of August, 1903, Dr. G. J. Van Vechten of Oneonta, N. Y., and James Murray of Utica, N. Y., saw "a fine specimen of a Panther," in broad daylight, near Dart's Camp, on Eagle Bay Road, Big Moose, N. Y. Full details are given by Harry V. Radford in *Field & Stream*, Xmas No., 1903, pp. 671–73.

New Jersey

"Originally found in every part of both States [N. J. and Penn.] but always more abundant in the Alleghany Mountains. In New Jersey, it became extinct in the early part of the 19th century, the last probably occurring in Sussex or Warren counties, as strays from northeastern Pennsylvania. No dates of their extinction in New Jersey have been secured."[59]

Pennsylvania

"In Pennsylvania they have not been killed, so far as I can substantiate the accounts that have been published, since 1871, though one statement would imply that 2 have been killed in Clinton or Clearfield counties in 1891."[60] He also gives details of Panthers found in Pennsylvania, 1875, 1877, 1886, 1893.

Eagleton. One of the latest records describes a whole family of Cougars or Panthers, seen by Senator Richard S. Quigley of Lock Haven, Pa., in the early summer of 1900, near Eagleton, Clinton County, Pa. Senator Quigley, at that time a youngster of about 14 and an ardent sportsman, was on a fishing trip with a man named Daniel Kunes of Blanchard, Center County, Pa.

"We were," he says, "within about 2 miles of Eagleton, walking along a very narrow brushy road. On making a sharp turn in the road, ahead of us about 100 yards on a very sandy place were 4 very strange animals playing

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[58] Forest & Stream, Sept. 4, 1909, p. 374.

[59] S. N. Rhoads: Mamm. Penn. and N. J., Phila., 1903, p. 128.

[60] As above.

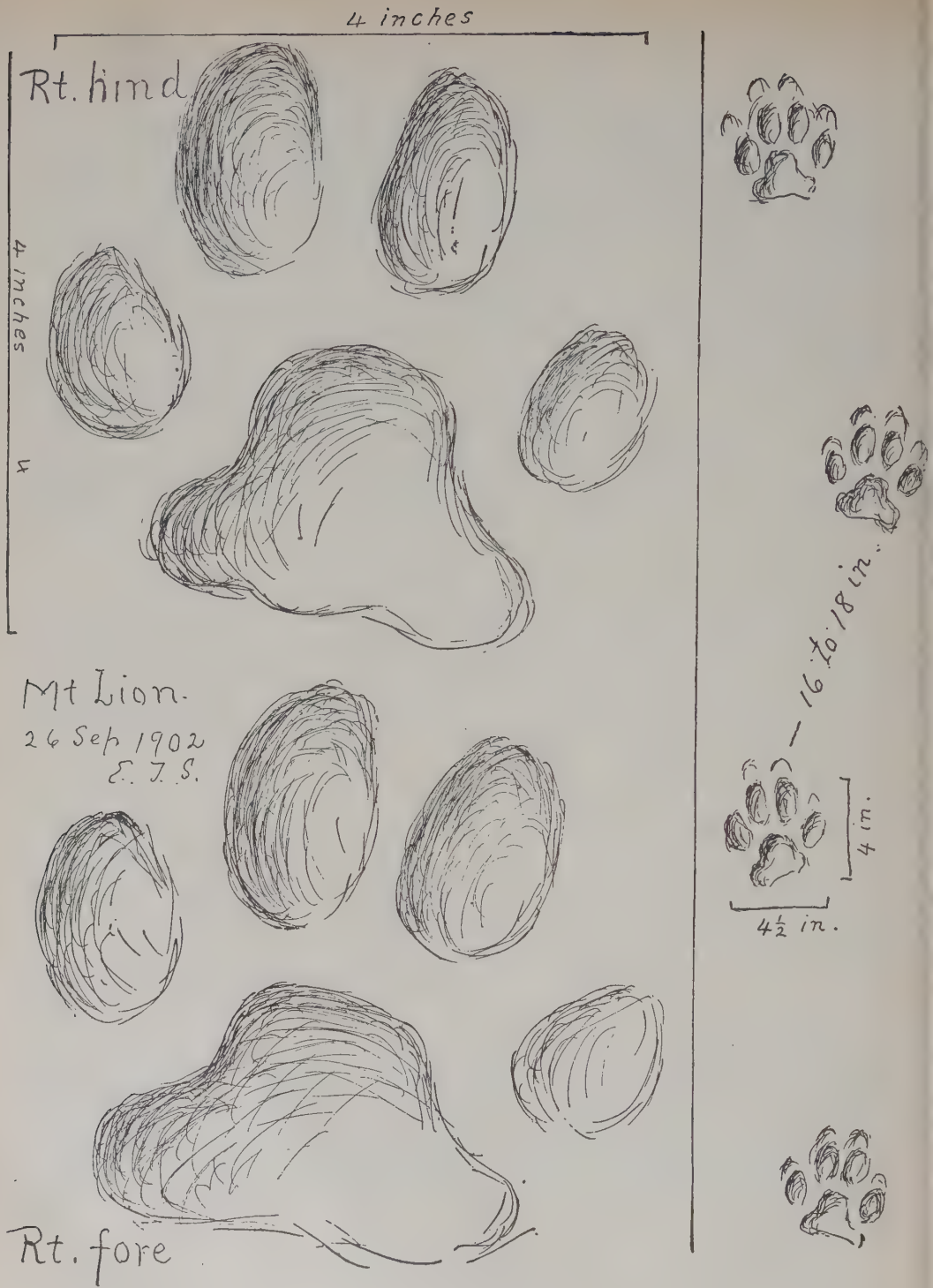

PLATE IX—COUGAR TRACKS

A large male in Bitterroot Mts. Cougar tracks are much like those of other Cats; size is the principal difference. But those of the Cougar are less stubby than those of the Jaguar.

in the sand, evidently sunning or dusting themselves. Two were very large animals for that section of the country, and 2 were smaller, evidently a family of Cougars. . . . They were of a very tawny colour, the larger beasts in the body being 4 or 5 feet long with long tails. Of course, we knew right away they were not our ordinary Wild-cats, as they were much too large, also had long tails. We had a very good chance to observe them as they were frolicking about, and they did not notice our approach for some little time. When they saw us they bounded into the brush to the left of the road and we ran after, following them into the brush, hoping to get a shot at them with the guns we carried. But we saw nothing more of them."[61]

According to Col. Henry W. Shoemaker's "The Pennsylvania Lion or Panther," 1914, p. 35: "Potter County newspapers in 1911 recorded that the cries of a Panther were heard in the vicinity of Sweden Hill, near Coudersport, in the autumn of that year."

The cries alone are poor evidence. Lynx, Wild-cat, and hoot-owl all make wails and yells that a Cougar need not be ashamed of. However, better proof is coming.

"Panther tracks," he says, "were observed on the [Coudersport] Pike by Dr. Rothrock in 1913; in Detwiler Hollow in the Seven Mts. in the same year, by several hunters. . . .

"In November, 1913, several farmers heard Panther cries and one reliable person saw a Panther in his barnyard in Logan Valley near Altoona. Johnstown papers reported a Panther as doing much damage to Deer and other game on Laurel Ridge, in Somerset County, in the same month. There is probably a Panther path leading into Pennsylvania from the Maryland and West Virginia mountains. This is proved by the killing of a Panther in Nov., 1913, several miles north of Washington, D. C."[62]

In 1914, H. W. Shoemaker visited at the home of Aaron Hall, known as the Lion Hunter of the Juniata, slayer of 50 Panthers between 1845 and 1880. There were fragments of the hides of 11 Panthers in the attic, which were presented to him by the old Nimrod's sons and taken away in a burlap bag. Grant Hoover of Williamsport states that he was present when Hall brought in two gigantic Cougars in the late fall of 1878.

Shoemaker writes me that, even as recently as 1922, "a Panther watched the Askey family seated by their open fire, at Cold Springs, Center County. The next morning, they followed the tracks in the snow."

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[61] Personal letter, Nov. 20, 1923.

[62] Penn. Lion, p. 36.

West Virginia

In July, 1898, Andrew and John Moore, while fishing on Cranberry Mountain, W. Va., met a Cougar. Their description is very full and circumstantial; it is given in *Forest & Stream*, July 23, 1898, p. 64.

Kentucky

In *Trail Hound* magazine, Aug., 1923, Case Sharp of Coxton, Harlan County, tells of a recent hunt where his Dogs "trailed a Panther for 2 hours. But we had to let it go."

Florida

In Florida the Red Panther is still (1920) of general distribution. C. B. Cory, however, says that for one in 1898 there were 3 or 4 some 50 years ago. But the country is being drained and cleared at such a frightful rate that it cannot much longer persist.

Louisiana

Cougars were still fairly common in the wilder parts of the canebrake region of eastern Louisiana in 1904, according to N. Hollister;[63] and a few are doubtless found there to-day.

Arkansas

According to hunters that I talked with while in Arkansas, in 1920, the Cougar is still occasionally met with in the mountains in the northwestern corner of the State. But I was not offered any conclusive evidence.

Michigan, Upper Peninsula

Deerfoot Lodge. Near Taquamenow River, George Osborn, Charles Osborn, Mark Cady, and Ted la Londe caught a Catamount in a Wolf-trap; they photographed and killed it. It measured $5\frac{1}{2}$ feet in length.[64]

L'Anse. According to the Minneapolis *Journal* for Feb. 21, 1902, on that same date, "A Panther has been seen lurking in the vicinity of Silver River 7 miles from this village. The presence of the beast is enveloped in mystery. Hunting parties are taking to the woods in quest of the animal."

Ontonogan. Norman A. Wood cites a Panther record for Ontonogan County.[65]

[63] Louisiana Puma, p. 176.

[64] Sault Ste Marie News, Jan. 3, 1907.

[65] Mich. Mamm., p. 8.

Michigan, Lower Peninsula

Norman A. Wood cites Panther records for Washtenaw, Jackson, Oceana, Mason, Ingham, Montcalm, Allegan, Calhoun, Kalamazoo, and Eaton counties.[66]

Wisconsin

Black River. Dr. P. R. Hoy says (1882): "A few Panthers *Felis concolor* are yet with us; a straggler is occasionally seen. Benjamin Bones of Racine shot one on the headwaters of Black River, December, 1863."[67]

Northern Wisconsin. M. Strong says (1883): "Found rarely in the northern part of the State."[68]

Marinette County. "Mr. Geo. A. Williams of Cremlin, Marinette County, writes: 'Two Panthers were seen by Nelson and Albert Chapman and Ray Williams in this county on Jan. 2, 1909. This information is reliable.'"[69]

Douglas County. "Mr. Daniel Farnham of Manly, Douglas County, writes: 'There was a Panther killed in Douglas County about 3 or 4 years ago, and 1 shot at last winter but not killed.'"[70]

Minnesota

Pillsbury. J. Frank Locke in "Minnesota Game Notes" writes: "I recently had a bloodless encounter with a huge Panther, the only one seen in this locality for years."[71]

Sunrise. "The most recent occurrence of the Puma in Minnesota was in 1875 when a single individual was killed in Sunrise, Chisago County."[72]

Chippewa River. Capt. Jonathan Carver thus records meeting one on an island in Chippewa River: "The Tiger of America resembles in shape those of Africa and Asia, but is considerably smaller. Nor does it appear to be so fierce and ravenous as they are. The colour of it is a darkish sallow, and it is entirely free from spots. I saw one on an island in the Chippewa River, of which I had a very good view, as it was at no great distance from me. It sat up on its hinder parts like a Dog; and did not

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[66] Mich. Mamm., p. 8.

[67] Trans. Wis. Acad. Sci., V, 1877–81, 1882, p. 256.

[68] Mamm. Wis., Geol. Wis. Surv. of 1873–79, I, 1883, p. 436.

[69] C. B. Cory: Mamm. Ill. & Wis., 1912, p. 282.

[70] As above.

[71] Forest & Stream, April 19, 1883, p. 226.

[72] C. L. Herrick: Mamm. Minn. Geol. & Nat. Hist. Surv. Minn., 1892, p. 68.

seem either to be apprehensive of our approach, or to discover any ravenous inclinations. It is, however, very seldom to be met with in this part of the world."[73]

South Dakota

Grand River (370 miles north of Yankton on the Missouri west bank). Dr. W. J. Hoffman says: "*Felis concolor*, American Panther, In-mu-tan-ka. Occasional specimens are captured in the oakgroves on Oak Creek. The skins are seldom brought to the trader's store to exchange, as they are valued by the Indians in the manufacture of quivers."[74]

Black Hills. "Nov., 1887. Said to be common in the wildest part of the hills, one young was brought into town by a hunter who killed the mother and the other young. I saw it Nov. 2, a few days after it was caught, and think it would have weighed about 8 pounds then. The hunter said that the old one had just killed a large buck Blacktail Deer."[75]

Montana

Dawson County. "Tilyou's Ranch, Dawson County, Sept. and Oct., 1887: one is said to have killed a number of Sheep lately about 20 miles from here."[76]

During the 4 years, 1907–11, C. E. Ordish, hunter, of Libby, Mont., with 2 Dogs killed 74 Cougars on Pipe Creek and adjoining country.[77]

Idaho

According to *Forest & Stream*, July 14, 1906, p. 57, Henry Honenkrat killed 8 Mountain Lions that season in the Cœur d'Alêne Mountains, east of Spokane.

Wyoming

While in Jackson's Hole, Wyo., in Sept., 1898, I was shown the skins of 6 Cougars recently killed within a few miles. At another ranch 7 were killed within two months during the late winter and early spring of 1898. Another man, Albert Nelson, had 2 fresh skins. Indeed, each hunter—and all the ranchmen are hunters—had some Cougar notches on his gun.

[73] Travels, 1796, p. 295.

[74] Mamm. Vicinity Grand River, D. T., Proc. Boston Soc. Nat. Hist., XIX, March 7, 1877, p. 95.

[75] V. Bailey: Trip through Minnesota and Dakota, Ann. Rep. Dept. Agr. for 1887 (pub. 1888). Rep. of Orn. & Mamm., p. 431.

[76] As above, p. 431.

[77] Forest & Stream, May 20, 1911, p. 776.

Frank Peterson, one of the best-known guides, was sure that not less than 50 have been killed in Jackson's Hole within 5 years; nearly all were from the east side.

Colorado

In Jan. and Feb., 1901, Col. Theodore Roosevelt killed 12 Cougars at Meeker. That is not counting 3 small kittens destroyed by the Dogs. In Sept., 1901, John B. Goff, of Meeker, Colo., told me that since 1888 he had killed 350 Cougars.

California

In the 12 years 1907–19, 3,627 Cougars were officially killed in the State of California.[78] On the same page we learn that Jay C. Bruce, the State lion-hunter, recently killed 8 in one month.

During the year ending June 30, 1918, the Biological Survey, U. S. Department Agriculture, according to its report, destroyed 85 Cougars in the West. The reports for the first 3 months of 1919 show that in California 111 Cougars were killed (which means that the rate of destruction is increasing.)[79]

[78] Cal. F. & G., April, 1921, p. 101.

[79] As above, July, 1919, p. 148.

The early writers speak of the Cougars as formerly abundant;[80] in considerable numbers, etc.[81]

We are fortunate in having more exact information supplied us by Col. H. W. Shoemaker: "The woods [of Pennsylvania] teemed with them."[82] And again: "[The Cougar] was found in great numbers in Lycoming and Sullivan [counties, Pa.] . . . Panther skins were as prevalent on the walls of old-time farm buildings as Raccoon skins are to-day. Almost every backwoods kitchen had a Panther coverlet on the lounge by the stove. Panther tracks could be seen crossing and re-crossing all the fields, yet children on their way to school were never molested."[83]

In Luzerne County, between 1808–20, bounties amounting to $1,822 were paid for scalps, probably representing 200 Panthers. "More than 50 of these superb animals were killed in one year."[84] "Sam. Askey of Snow Shoe, Center County, killed 64 between the years of 1820 and 1845. These were taken in a limited district, and all of this great hunter's neighbours were engaged slaying Panthers at the same time. During these 25 years it is estimated that 600 Panthers were killed in Center County."[85] Hundreds were slain in Susquehanna County, Wyoming County, Lycoming, Sullivan, Clearfield, and farther south, but less so in the less mountainous counties to the northwest. "In an early day in Center County, hunters who had killed 50 Panthers were of no rare occurrence."[86]

The climax of slaughter, wanton and criminal, is set forth by Shoemaker.[87] Here he tells of a great animal drive organized by one Black Jack Schwartz in the woods of Pennsylvania, near Pomfret Castle, on the West Mahantango Creek in 1760, in which were killed, "41 Panthers, 109 Wolves, 112 Foxes, 114 Mountain Cats, 17 Black Bears, 1 White Bear(?), 2 Elk, 98 Deer, 111 Buffaloes, 3 Fishers, 1 Otter, 12 Gluttons, 3 Beavers, and up-

[80] Bachman: Q. N. A., II, p. 307.

[81] Godman: American Natural History, 1842, I, p. 294.

[82] Penn. Lion, p. 22.

[83] As above, p. 23.

[84] As above, p. 22.

[85] As above, pp. 22, 23.

[86] As above, p. 24.

[87] As above, p. 25.

wards of 500 smaller animals."[88] The drive covered a circle of 30 miles in diameter; reference to the map shows that it must have included most of Snyder County.

This gives some idea of the comparative numbers of the large game in that region, though not an exact one, for the drive was against the predaceous animals, and it is improbable that the hunters killed all the Deer, Elk, Beavers, etc., that they could. Furthermore, it is likely that at least twice as many Panthers escaped as were killed, for the 200 hunters who made the drive were on a 100-mile circle at the beginning; that is, half a mile apart in thick woods.

These records tell a story of whiteman's senseless destructiveness and redman's righteous indignation not surpassed in the annals of America.

"The choicest hides were taken, together with Buffalo tongues, and then the heap of carcasses 'as tall as the tallest trees,' was heaped with rich pine and fired. This created such a stench that the settlers were compelled to vacate their cabins in the vicinity of the fort, three miles away. There is a small mound, which on being dug into is filled with bones, that marks the spot of the slaughter, near the headwaters of [West] Mahantango Creek. Black Jack's unpopularity with the Indians was added to when they learned of this animal drive. The redmen, who only killed such animals as they actually needed for furs and food, resented such a wholesale butchery. The story has it that the Wild Hunter was ambushed by Indians while on a hunting trip and killed.[89]

. . . . . .

"After the great slaughter at Pomfret Castle, many backwoodsmen appeared in full suits of Panther skin. For several years they were known as the 'Panther Boys,' and in their old age they delighted to recount the 'big hunt' to their descendants.

. . . . . .

"The Panther uniforms were abandoned because they became favourite targets for skulking Indians. The savages, infuriated by the arrogance of the white newcomers, spared persons falling into their power occasionally, but gave no quarter to a 'Panther Boy.' The great slaughter of animals indirectly kept alive ill feeling between the two races in the region of the Firestone Mountains, and probably a dozen settlers lost their lives because of it. However, they went on with their animal drives, as the hardy settlers loved to do what the Indians hated."[90]

[88] Penn. Lion, p. 26.

[89] As above, p. 27.

[90] As above, p. 27.

Did human hand ever set on paper a more loathsome story of insensate destruction? These vile butchers did not need the meat, or the hides, for they destroyed them. They did not seek the real joys of the chase, for the joys were over before the massacre began. There is no such joy in a shambles. They did not need the land, for it was one mountainous primeval forest. No one pretended that the wild things were a serious menace.

There was no courage in the vile undertaking, for the whites far outnumbered the Indians and had much better weapons. There is absolutely no shadow of excuse, and the names of Black Jack Schwartz and his bestial accomplices must be held up to the reprobation of decent men for all time.

The shameless and deliberate way in which these creatures desolated their country is sufficiently indicated in this sentence: "Animal drives did not cease with Black Jack's death, but in some localities they were held annually until game became practically exterminated."[91] The last "ring" hunt or animal drive was held in Center County, Pa., in 1849.

And this was exactly the same thing as the Covernment did in our day out West. The soldiers had orders to slaughter all the game they could all the time, especially Buffalo, because so long as the game abounded the Indian could not be controlled.

There are few available figures to illustrate the slaughter which undoubtedly proceeded along the same lines in other States. J. R. Simms records that Thomas Meacham, a trapper who died about 1849, killed 77 Panthers during his hunts in the Adirondacks, N. Y.[92] Merriam records in 1883 that the hunter E. L. Sheppard had killed up to that time 28 Panthers in the Adirondacks. But that covered a number of years and was merely the rounding up of the remnant. This author believes that nearly 100 Panthers were killed in the Adirondacks between 1860 and 1883.[93]

Referring to the same region, G. S. Miller says that from 1871 to 1897 inclusive, 107 Cougars were killed officially in or about the Adirondacks, N. Y. The latest was in 1890, probably the last of the race, as none have been killed there since.[94]

A wonderful picture of primitive life in Central Kansas is given by Z. M. Pike when at the headwaters of Grand River between the Kansas and

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[91] Penn. Lion, pp. 26–27.

[92] Trappers of N. Y., 1850, p. 271.

[93] Mamm. Ad., p. 39.

[94] Mamm. N. Y., 1899, p. 339.

the Arkansas, Sept. 12, 1806.[95] He says: "Standing on a hill, I beheld in one view below me Buffaloes, Elks, Deer, Cabrie, and Panthers."

The ideal Panther conditions are seen in the northwest corner of California to-day, where the favourite cover and food abound; that is, heavily forested rugged hills with plenty of Deer.

In this region, Humboldt County with its 3,500 square miles has paid 505 Panther bounties in 10 years, and still its numbers stand the drain. As will be seen later the estimated annual increase of the species is only 10 per cent. This argues a present population of 500, or, say, 1 to every 10 square miles.

Since writing this I learn that in California where, taking the entire State, Cougars are no longer plentiful, their total number is set at 575.[96] But the Pennsylvania drive proves a much higher rate of population, probably double, so that we begin to realize the meaning of the old historians when they write that Panthers "abounded," were in "teeming numbers," etc.

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[95] Exploratory Travels, 1811, p. 177.

[96] Cal. F. & G., Oct., 1917, p. 165, and April, 1921, p. 99.

Present Numbers and Distribution

The shaded areas on the map indicate where in general the Cougar is found to-day (1920). In the region of darkest tint, it is considered fairly numerous. In the Eastern States, it is virtually extinct. If there is a pair of Cougars in the Green Mountains, Vt., now, it is the highest possible number. If there are 6 pairs in the mountains between the Catskills and Georgia, I should be agreeably surprised. In the section on "Interesting Records," I give all I can find in recent years for this devastated area.

In the Rocky Mountains, the big Cougar whose scientific name is "Horse Thief" was found in numbers as late as 1900; was most numerous in the famous Deer country of the Central Rockies; also along the Grand Canyon, and is still found in these regions.

In the mountainous parts of California, Arizona, Washington, Southern British Columbia, and Vancouver Island, the creature is still considered rather common. In British Columbia, as already noted, over a hundred are killed each year for the bounty, and still it continues. In California, where persistent exterminatory hunting is carried on, 200 or 300 are killed each year, and the authorities announce their determination to keep on to the end.

In all this melancholy chapter of ruthless extermination, this remorseless destruction of one of the most beautiful creatures that ever lived, I find but one note of comfort—that in spite of the wholesale slaughter, "these animals are still abundant in most of the [northern California forest] counties. . . . Nor, notwithstanding the apparent decrease in numbers, is the Mountain Lion yet under control, and it continues its depredation not only on Deer, but on domestic stock."[97]

Nevertheless, the destroyers have so far succeeded that in 1921, as already noted, the total Cougar population of California was estimated down to 575, and I doubt if there are 5,000 of the species alive in America to-day, north of the Rio Grande.

Haunts

The favourite haunts of the Cougar are rugged mountains with forests in which Deer are abundant. It is also found in level or half-wooded

[97] H. C. Bryant: Cal. F. & G., Oct., 1917, p. 160.

country that is plentifully supplied with wild turkeys, or uplands where Mountain-sheep are in numbers, but these are not its ideal conditions. It is probable that it was originally found in the greatest numbers in the rugged parts of the teeming Deer forests between the Mississippi River and the Alleghany Mountains, and between the coast range and the ocean from Northern California to lat. 52° in British Columbia.

Home Range

There seems little doubt that the Cougar is one of the widest ranging of all our big game.

The smallest range of the individual is that of the female when the cubs are too small to follow her abroad. Then she must stay near home. At this time, according to Harold C. Bryant, she hunts within a radius of 5 miles of the den.

But later in the season, when the young can travel, or in winter when game is scarce or moving, it is very different and the family may travel 20 or 30 or even 50 miles from their headquarters which is the neighbourhood of the home den. The lone male especially is a wide roamer.

Bryant says: "One in Trinity County when followed was found to have covered a distance of about 20 miles in 3 days. The same beat is often used for a long time."[98]

John B. Goff told me of more than one Cougar that he followed for 36 hours before coming up with it; this meant a circuit of over 50 miles.

H. G. Hayes[99] tells of following a Cougar for 6 days, and Col. Shoemaker[100] records a hunt which lasted for nearly two months before the Cougar was brought to bay.

The occasional appearance of Cougars in the Green Mountains, Adirondacks, Laurentians, or the Riding Mountains in Manitoba, where the species had probably been exterminated, seems to show that when food is scarce this animal will roam for a hundred or even several hundred miles. This depends almost entirely on the abundance or scarcity of game.

The Hide

It has been my lot once or twice to see a Cat killed by a Dog, and though many bones were broken in the battle, the skin of the victim never was. In skinning Cats I have noticed each time the toughness of the hide, especially on the forequarters and neck of the male.

[98] Cal. F. & G., Oct., 1917, p. 161.

[99] Forest & Stream, July, 1917, p. 306.

[100] Penn. Lion, p. 39.

So it was without suprise that I read in Roosevelt's account of killing the last of his twelve Cougars: "Neither in this nor in any other instance," he says, "did any one of the Dogs manage to get its teeth through the thick skin. When Cougars fight among themselves, their claws and fangs leave great scars, but their hides are too thick for the Dogs to get their teeth through."[101]

It is quite generally understood and accepted among the old hunters that when a Cougar skin is found cut, slashed, or scarred, the wounds were received in combat with one of his own species.

The Flesh

Samson's riddle, "Out of the eater came forth meat," seems most apt for the Cougar. Strange to relate, for the case seems unique among flesh-eaters, the meat of this animal is excellent eating. This is mentioned by most of the early writers—all who have tried it indeed—and I can add my testimony to the record.

Among the old-time hunters of this vanishing creature the tradition still persists of a feast on the animal's flesh as the proper finish to a successful hunt.

I never tried the meat at that supreme moment, but if it is good, it must be very different from Bear's meat in all its reactions, for I do not know of any flesh more repulsive, or even dangerous, than that of an old Bear that died fighting Dogs and men.

The Tail

Old Joseph Wolf, the celebrated animal painter, was one of my teachers in animal drawing, and I shall never forget the day we stood before the Cougar cage in the London Zoo while he voiced his admiration of the Cougar's long, expressive tail.

"Look at those miserable switches," he said, as he pointed in scorn at the Tigers' tails in the next cage.

"Why, the smallest Cougar has a finer tail than the biggest Tiger. It's grand, it's full of character, it is next in size to that of the Lion, or relatively far larger."

Yes, the Cougar should be proud of his tail. But what is it for? That I never could make out. A Fox's tail is a muffler when he sleeps, a Squirrel's is a parachute, a Monkey's tail a balancing pole when he walks aloft, but the Cougar needs none of these things, and I have many notes that show the tail to be a handicap to him.

[101] Scribner's, Nov., 1901, p. 547.

Roosevelt tells of a powerful she-Cougar that was escaping up a tree from the Dogs, when "either Tony or Baldy grabbed her by the tip of the tail, she lost her footing for a moment, and the whole pack seized her."[102]

Charles J. Lisle relates how one of his Dogs attacked the Cougar's head and then seized its flank while a third "bit its long tail."[103]

Bachman writes of a Cougar at bay which got hold of the hunter's Dog and would have killed it but the man seized the beast by the tail, "and broke his back with a single blow of the axe."[104]

Judge D. C. Beaman of Denver tells of a big Cougar at bay on a down tree. "When he squatted, his tail hung within reach of the Dogs and one of them took a fly at it, and came near bringing the old fellow out. Then he had to stand up to keep his tail out of reach."[105]

The most amazing incident of this kind is supplied by Hugh Johnson, who describes a wilful little hunting Dog that he had; a Dog that might have been the prototype of "Skookum."[106] "A number of times," he says, "I have seen him overtake a Panther, and catch the end of its tail in his mouth, stick out his feet and make the Panther drag him through the snow. Of course, that would make the Panther mad, and it would slow up and turn around and try to kill the Dog. But when it did this, it always found when it made a stroke at him with its paw, that he was not there. He was somewhere else."[107]

All of which observations seem to stigmatize the tail as a handicap, a nuisance to its owner, and therefore in no way justifying the forces that developed that long, massive, and conspicuous appendage. Its thick coat of fur and black tip make it look larger than it is, but they do not add to its length. It seems probable that the immense tail is a "left-over" from some early ancestor, arboreal or aquatic, to whom it was really of service. At present its only use seems to be as an organ of expression and a plaything for the cubs. The tail-lashing when at bay is noted by all observers, as well as the kittenish upcurl in frolic.

There is also a ceaseless, nervous snaky twisting of the tip that may have a meaning. A Cougar is stalking a Deer. Another Cougar comes along and not knowing of No. 1 being there, proceeds to stalk same Deer. Coming from the same direction, that is, working up wind, No. 2 might

[102] Scribner's, Nov., 1901, p. 548.

[103] Field & Stream, Jan., 1915, p. 933.

[104] Q. N. A., II, p. 311.

[105] Sports Afield, Mar., 1900, p. 204.

[106] Rolf in the Woods (Doubleday, Page & Co.).

[107] Forest & Stream, Oct. 5, 1907, p. 532.

easily mistake No. 1 for the Deer, and at least spoil the chances for both, before he found out the error. But long before that the unmistakable black tail-tip twisting behind and out of all ken of the Deer gives notice to No. 2 that the matter is already in excellent hands, so he goes about his business elsewhere.

Each of the Cats on this list (except the Eyra) has the tail-tip marked in some conspicuous manner—either black, black and white, or tufted, or all three—and each of them has this habit of tail-signalling, with the possible exception of the Eyra. Surely there is more than coincidence in this.

The Voice of the Cougar—The Panther Scream

Does the Panther scream? What long bitter battles have been fought over that question.

First, every one of the old historians who wrote about the species when it abounded, credits the Panther with uttering wild screams and half-human wailing sounds that can be heard a long way.

Careful natural history did not begin till the middle of the past century. Let us therefore not go farther back, but seek the opinion of modern naturalists beginning with Emmons, who says that "the Panther frequently utters a scream which can be heard for miles."[108]

Dr. C. B. R. Kennerly says that on the Mexican Boundary Survey, on one or two occasions the cry of the Puma was heard in the distance and Schott writes that after dark "his mournful note is heard resounding through the solitudes of the deserts. The note, listened to once attentively, is apt to make a deep, lasting impression. The different native names, as pronounced in Spanish, sound very appropriately to the note, and it is likely that the cry of the animal forms the base of its names. The note itself is often several times repeated with intervals of from 2 to 4 minutes. As night advances the cry is heard but rarely."

He also says that one which the hunters fought to death "raised a terrible cry twice or thrice, to express his rage, and perhaps also to give his family the notice of danger."[109]

Roosevelt says that near Kildeer Mountains he "twice heard a loud wailing scream ringing through the impenetrable gloom which shrouded the hills around us. My companion, an old plainsman, said that this was the cry of the Cougar prowling for its prey. Certainly no man could well listen to a stranger and wilder sound."[110]

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[108] Quad. Mass.; 1840, p. 37.

[109] U. S. Mex. Bd. Surv., Pt. Mamm., 1859, p. 6.

[110] Wilderness Hunter, p. 343.

And again: "We did not hear the Cougars calling, for they are certainly nothing like as noisy as Wolves; yet the Mathes brothers had heard them several times, and once one of them had crept up and seen the Cougar, which remained in the same place for many minutes, repeating its cry continually."[111]

In similar tenor are the writings of Dr. J. A. Allen, D. G. Eliot, Dr. J. T. Rothrock, H. W. Shoemaker, and the testimony of scores of hunters. Grizzly Adams, one of our safest observers of big game, gives the following in connection with his Cougar hunt in Humboldt Mountains, Nevada, in 1854.

"As soon as it grew quite dark, our ears were regaled with a concert of Panther shrieks, quite astounding. We were so situated that every shriek was repeated by a dozen echoes, and the cañon fairly rung with terrific noises. We could also hear the beasts rushing along in the brush, but could not see them. At midnight it became more silent, but toward morning the concert was repeated; from which it appeared that the beasts had left their dens in the evening, hunted for prey during the night, and returned towards morning."[112]

Shoemaker states that 50 hunters and old-timers corroborated the statement that the Panther utters the wild cries attributed to him, then adds the final testimony of the late Dr. J. T. Rothrock, the well-known scientist whose medallion in the Capitol at Harrisburg was recently dedicated by Governor Pinchot: "That Panther cry—I have often asked myself how I could describe it, and failed to satisfy the inquiry, though I think I have at this very moment a somewhat clear remembrance of it. It would not be an adequate reply if I said it sounded like the wail of a child seeking something, a cry, distinct, half inquiry and half in temper. There was something human in it, though unmistakably wild, clear, and piercing. And yet I do not know how to make a more satisfactory reply, except to say that the cry seemed to be in all its tones about a minute long. I heard it one evening in Treaster Valley, repeated so often that I could recognize it as coming from an animal moving along the rocky slope of the mountain where no child could have been at that hour, and was told by those residents in the region, 'Oh, it's the *Painter's* cry.' It did not seem to be unusual to them. That was about twenty years ago."[113]

N. Hollister in his paper on the Louisiana Puma[114] has much to say about

[111] Scribner's, Nov., 1901, p. 556.

[112] Adv. J. C. Adams, p. 246.

[113] Penn. Lion, pp. 41–42.

[114] Proc. Biol. Soc., Washington, June 16, 1911, p. 177.

the Panther calls he heard, as two answered each other in the dark woods. "The cry is a long drawn out, shrill trill, weird and startling. It commences low on the scale, gradually ascends, increasing in volume and then lowers at the end."

Edward T. Martin tells of an Olympic hunt in which his party killed a Deer. "All that night the woman-like cry of a Cougar was heard as he trotted in wide circles around the offal, seeming to fear it was bait for a trap. He walked and wailed, and wailed and walked; his noise, the uneasiness of the Horses, and the growls of the Dogs making sleep impossible until coming daylight drove him into retirement."[115]

Enos A. Mills writes: "Of the dozen or more times that I have heard the screech of the Lion, on 3 occasions there was a definite cause for the cry—on one a mother frantically sought her young, which had been carried off by a trapper; and twice the cry was a wail, in each instance given by the Lion calling for its mate, recently slain by a hunter."[116]

Colonel Shoemaker writes me that "Cornelius Karstetter watched a pair of Cougars migrating across Sugar Valley, Clinton County, Pa., by their path in the fall of 1876. He saw them from his kitchen window, as they braced themselves and 'roared.' The Pennsylvania pioneers always speak of the 'roaring' of the Cougar."

Opposed to all these hundreds of witnesses I find four, Darwin, Bachman, Merriam, and J. C. Bruce. Their testimony is as follows: "It is a very silent animal, uttering no cry even when wounded, and only rarely in the breeding season."(Darwin)[117]

Bachman says: "The tales related of the cry of the Cougar in the forest in imitation of the call of a lost traveller, or the cry of a child, must be received with much caution, and may, in many of their exaggerations, be set down as vulgar errors. In a state of captivity we have never heard the male uttering any other note than a low growl; the female, however, we have frequently heard uttering a kind of mewing like that of a Cat, but a more prolonged and louder note, that could be heard at the distance of about two hundred yards.

"All the males, however, of the Cat kind, at the season when the sexes seek each other, emit remarkable and startling cries as is evidenced by the common Cat, in what is denominated caterwauling. We have observed the same habit in the Leopard, the Ocelot, and in our two species of Lynx. It is not impossible, therefore, that the male Cougar may at the rutting sea-

[115] Forest & Stream, Sept. 19, 1914, p. 364.

[116] Watched, p. 200.

[117] Voy. of Beagle, p. 270.

son have some peculiar and startling notes. The cries, however, to which persons have from time to time directed our attention as belonging to the Cougar, we were well convinced were uttered by other animals. In one instance, we ascertained them to proceed from a Red-fox which was killed in the hunt, got up for the purpose of killing a Cougar. In other cases the screams of the great horned, the barred, or screech owl are mistaken for the cries of this animal.[118]

Merriam, after throwing general discredit on the idea of Panthers yelling, says: "In conversing with honest hunters upon this point it has been my uniform experience to find that those who have had most to do with Panthers are the most skeptical in regard to their cries; and I have yet to find the man whose statements on this point are of any value that has ever heard a wild Panther scream. This is negative evidence, it is true, but it is by no means without value; and it is certainly safe to assert that at least 99 per cent. of the so-called 'Panther screams' emanate from a widely different source."[119]

This, however, was written in 1883. Since then Merriam has lived much in the mountains of California, and now concedes that the Western animal at least has a number of hair-lifting yells or screams.

Jay C. Bruce puts no faith in the stories of the Cougar's screaming and crying. He says: "No doubt, many people have heard yells in the night, and have honestly believed that they were listening to a Mountain Lion, but in the large majority of cases, it was a Coyote that they heard. Sometimes an owl will make a terrible noise, but Lions—never to my knowledge. I have seen them battling the Dogs, fighting in defense of their young, searching for a mate—under all sorts of circumstances—but never yet have I seen one while he was in the act of screaming. They growl and spit, like an angry Cat."[120]

As I read these conflicting statements I feel that each and every witness was stating the truth as he knew it and was right as long as he avoided sweeping generalizations.

Darwin had very few opportunities to observe the animal, certainly not during the whole circle of its annual life.

Bachman withdraws his own case when he admits that the male Cougar, like the other great Cats, may have some startling notes at the rutting time.

Merriam's observations were made in a region where the Cougar was

[118] Q. N. A., II, pp. 311, 312.

[119] Mamm. Ad., pp. 37, 38.

[120] Field & Stream, Oct., 1921, pp. 580–81.

rare and much hunted and many of his facts were supplied by the hunter Sheppard who followed the animal chiefly in snowtime. This evidence is strictly negative, as also is Jay C. Bruce's testimony.

Let me add my own positive observations. In the summer of 1885 I made for Merriam the Panther drawing now hanging in his house. During the three or four days I worked at it, the creature, a Colorado specimen, had frequent outbursts of yelling and caterwauling. The noise it made was terrific, amply justifying all the foregoing descriptions.

In the Zoo, London, England, Feb. 26, 1915, a female Puma from Cesquiera, Pernambuco, S. A., drew a crowd among which was myself, by keeping up a nearly continuous hoarse caterwauling, sometimes lowered to a growl and sometimes raised to an unpleasant human-like screech.

My sifting of the evidence gives these definite conclusions:

First, all of the large Cats that have been fully observed have a great variety of growls, snarls, yells, cries, roars, etc., to express varying emotions, as well as a prolonged strain or close succession of noises that serves as a song.

Second, any one observing a House-cat, only by the fire, prowling through the meadows, or caged at a Cat show, would describe it as a very silent animal and be utterly puzzled by the perfectly hideous performance of screams, yells, growls, and caterwauling with which they too often rob a neighbourhood of sleep.

Third, hundreds of good witnesses testify to the Cougar's cries and yells, while 4 good witnesses offer the negative evidence that they believe it to be a rather silent animal.

Fourth, I know that 2 caged Cougars yelled by the hour exactly as described.

My conclusion is that all the testimony is true. That the Cougar is sometimes a very silent animal, especially when hunting or hunted. But at other times, especially when signalling to its mate, when defying a rival, when making love, or when indulging in the song that is a mere expression of vigour, it has just as many sounds as the common Cat; they are of the same types as those of the Cat, but they are magnified and intensified to a scale fitted to the superior bulk of the Cougar; that is, about 20 times.

Finally, the individual variation is so great in these animals, that any general rule is sure to fail at times.

If any one were to catalogue and describe these various yells, squeals, growls, spits, and wails, he would have a list exactly paralleling the vocal score of a tomcat. Instead of attempting that, I shall cite three remarkable records.

"The unearthly wail of the Puma or Mountain Lion, [is] demoniacal and ghoul-like as no other sound in the wide realm of nature. As it re-echoes through the forests, you involuntarily shudder, for it is more like a woman's long-drawn and piteous cry of terrible anguish than any other sound you could liken it to."[121]

W. H. Pigg of Canyon City, Colo., with Dave Crouch and Frank Powers, went hunting a pair of Cougars 12 miles north of his town in Dec., 1911. They had shot the female and knew that the male was near. But night came on and they made for camp.

"On our way we heard, as we thought, Frank's 'Whoo-ee,' but got no reply to our answer. Again several times before reaching the top we heard the same 'Whoo-ee.' Each ti ne one of us answered, but without reply.

"Frank had a nice big fire when we dragged our tired selves on top. 'What the deuce were you yelling so for? Were you afraid we were lost?' we asked Frank.

"'I have been sitting by this fire as quiet as a mouse. Ring had just arrived when I got up,' he replied.

"Dave and I looked at each other. Then we both understood; the sound we heard was the Lion calling for the dead mate."[122]

The last incident given by Hugh Johnson[123] has much of interest besides its notes on the vocal power of the Cougar.

The hunter was prospecting out in Washington; he had killed a Deer and camped for the night, as it began to rain.

"Before it began to rain I thought I heard a Panther call off to the west higher up on the mountain side, and a little while after I heard another faint call off to the east. I did not pay much attention to that, but soon I noticed that these animals seemed to be calling to one another and to be getting closer, and I reckoned that one of them had smelt my meat and was coming up to find out what it was that smelt so good. I was a good deal younger then than I am now and knew considerably less about Panthers, and I did not know but that they might come right into camp and take my Deer away from me. I would not have liked that, and I did not mean to have them do it. There was plenty of wood around and I packed in quite a load close to the fire and then began to pile it on. There were one or two small hard-wood trees not very far from the fire, and as the Panthers kept getting closer, I swung myself up into one of these and climbed up fifteen or twenty feet. From here I had a good view of the fire and a good view of the Deer.

[121] Baillie-Grohman: Camps in the Rockies, 1898, p. 83.

[122] Outdoor Life, July, 1913, p. 9.

[123] Forest & Stream, Oct. 5, 1907, p. 533.

"The Panthers kept calling and kept getting nearer, and after a while they seemed to be right close, not more than 50 or 60 yards from the fire. After they got right close they began circling my fire, still calling to each other. It was not very long before they evidently came together, and then they stopped calling and began to moan and holloa at each other, just about as a couple of common tomcats would, only with twenty times more noise. Then they seemed to have a regular tomcat fight, with hissing and spitting and caterwauling in great shape. After that it was quiet for a while and the fire was dying down, and then presently I happened to look over on the other side of the fire, and there, just within the circle of light, I could see a big Panther looking at my Deer. He looked mean and hungry and gray, as well as I could see by the fire, and he kept slowly crawling nearer to the Deer, not seeming to pay any attention to the fire.

"Presently, when he got about 10 or 12 feet from the Deer he sort of settled himself down into the ground to spring and I tried to draw a bead on him. It was not easy to see my sights in the dark, but I was looking toward the fire, and at last I drew rather a coarse sight and aimed well down toward the bottom of the Panther's body and shot. He gave a big jump toward the Deer, but did not reach it, and landed all doubled up at the foot of the tree the Deer was hanging on. After that he never moved. I sat up there for awhile, waiting to see what would happen, and then I climbed down and built the fire up again and hauled the Panther away and began to skin him.

"I felt a little nervous all that night, thinking maybe the other Panther would come around and show up, but he never did. I expect they had a fight and the big one scared the little fellow out of the country. The one I killed had a fresh bleeding scratch on his shoulder that I expect the other one had given him.

"I have heard that out in that country sometimes the male Panthers have terrible fights and sometimes one is killed by the Panther he is fighting."

Purring. So far as known, all small Cats purr, and none but Cats purr. This peculiar sound is thus explained by E. Kay Robinson of the English *Country-side Leaflet*. The climax of joy to any of the tribe is when it has gripped its victim by the throat and is drinking the life-blood. The hard breathing of the hunter as the warm blood gurgles down its throat produces the gargling sound known as the purr.

This, so long associated with extreme satisfaction, has naturally become the expression of pleasure.[124]

[124] Guide to Nature, April, 1915, pp. 363–64.

Plate XI. The Hunting Cougar.

Nevertheless Dr. W. H. Osgood of the Field Museum tells me that Lions, Tigers, Leopards, and Jaguars do not purr.

Marriage Customs

What are the mating customs of the Cougar? Is it promiscuous, polygamous, or monogamous?

Promiscuousness is so rare among the higher animals, and so excluded by evidence to be offered on the third possibility, that it need not be considered seriously, and is mentioned only because some few have charged the species with this low standard of morals.

I think it is a rule that among polygamous animals, the male is always much larger than the female, or wholly different in colour or armament; for example, Elk, Bighorn, Fur-seal, etc.; whereas, among monogamous animals, the sexes are alike, except that the male is larger and better equipped for securing the female by combat, as in Wolves, Foxes, Tigers, etc. According to this reasoning, the Cougar belongs to the monogamous class.

The first positive statement on the subject of polygamy is by Col. Theodore Roosevelt, who says: "In some books the writers speak as if the male and female Cougar live together, and jointly seek food for the young. We never found a male Cougar anywhere near either a female or a pregnant female. According to my observation the male remains with the female for only a short time, during the mating season, at which period he travels great distances in search of his temporary mates—for the females far outnumber the males. The Cougar is normally a very solitary beast."[125]

The statement that the females far outnumber the males does not agree with all the evidence. Thus, of the 111 Cougars killed in California in January, February, and March, 1919, 53 were males and 58 females. Merriam records the killing of 5 males and 23 females, while Edward G. W. Ferguson says "not 1 in 10 of the Mountain Lions killed is a female."[126] Ferguson is the only writer I find besides Roosevelt who thinks the species polygamous.[127] But he injures his case by claiming also that the male is the deadly enemy of the young, making it his business to ferret out and destroy all he possibly can, and usually with huge success. I have heard hunters tell the most astounding tales along this line and therefore feel it worth while to show the absurd impossibility of such a habit.

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[125] Scribner's, Nov., 1901, p. 549.

[126] Field & Stream, Oct., 1911, p. 611.

[127] The King Cat of the Rockies. Field & Stream, Oct., 1914, p. 610.

First, there is the theoretical objection that no species can live by cannibalism; even a small degree of this vice is enough to turn the balance against it and wipe the creature out.

Second. This same charge was persistently made at one time against the wild turkey and the Wolf. Now we know the males of these species to be devoted parents.

Third. The positive evidence in the section on monogamy shows it to be absurd.

So far as I can learn, no man ever actually *saw* anything that gave support to this idea. The whole notion has been invented to explain the mournful wailing and moaning of the species, said lamentations being assumed to be those of Rachel mourning for her children, beyond the possibility of comfort.

Pairs. All the American Cats, so far as known, are monogamous; why should the Cougar be an exception?

Whenever two adult Cougars are found together they are male and female.

In Jan., 1912, Walter C. Dallas and his friends, hunting on Crystal Creek near Jackson's Hole, killed a large male Cougar that was travelling and hunting with a beautiful female.[128]

On Jan. 18, 1900, Judge D. C. Beaman of Denver, while hunting on Grand River, Colorado, put up 3 Cougars, 2 of which they got; they were a pair. What the sex or age of the third was, is unknown. Late in 1903, Charles J. Lisle found a pair together.[129]

On Jan. 22, 1901, Colonel Roosevelt found a pair together at Meeker, Colo.[130]

Bachman definitely states[131] that the Cougars go in pairs.

If we had full details of the courting ceremonies of the Cougar, I doubt not they would be found a close parallel to those of domestic Cats. Every scrap of evidence I can find points to this conclusion. One of the most amusing fragments is contributed by the picturesque pen of E. T. Martin. If I err not in the interpretation, it was a fight between two males over a female who was calmly enjoying it from some comfortable perch near by.

"One moonlight night, coming 'long the trail from town, I heard a lot of yowling like a yard full of Cats holding a ward caucus. Lions or Bobcats, I didn't know which and didn't care much. I knew they wouldn't bother me if I let them alone, and seeing as how my gun was in town, and a

[128] Forest & Stream, Sept. 28, 1912, pp. 393–94.

[129] As above, Jan., 1915, p. 932.

[130] Scribner's, Nov., 1901, p. 552.

[131] Q. N. A., II, p. 312.

pocket knife was all I had, I wasn't going to stir them up very much. I kept right on to where the trail took a sharp bend, and when I turned, there on the fallen trunk of an old dead pine stood the yowlers—two of the biggest Cougars I ever saw. They were sharpening their claws and facing each other like a couple of House-cats on a back-yard fence; then first one would scream, and after he'd hollered a bit, the other would join in on the chorus. Pleasant, wasn't it? Home 2 miles ahead, town 8 miles behind, and I tired out. Old Buck, the Horse, didn't much relish the situation and for such a bag of skin and bones was surprisingly lively, dancing and side-stepping like a two-year-old.

"I looked on a little while and as neither of them sports showed signs of having a home to go to or getting paralysis in his vocal cords, it was up to me to do something; so I went back a piece and cut a heavy club, then with old Buck between them and me, I started to go past them. The old Horse kinder crowded me a bit, but wasn't as much scared as I would have been in his place, 'cause they must jump over him to get me. Kinder reckon he knowed what cowards they was, 'cause he'd been in the mountains enough to have more sense than some of them tenderfeet I take in. Well, we had to pass within 'bout 20 feet of them. When we got opposite, they turned and faced us, snarled, spit like a Cat when she sees a Dog, then they faced about, jumped off the log and loped away. I did think, seeing there was two, they'd stand their ground; one, I knew would run.

"Next day I got some of the neighbours together and with a couple of Dogs we chased them sports until almost dark, and never got near them, and lost their trail in a windfall where the Dogs nor me either couldn't go."[132]

Now comes Mills, the keen observer, and says: "It is probable that Lions mate for life. Sometimes they live year after year in the same den and prowl over the same local territory. This territory, I think, is rarely more than a few miles across; though where food is scarce or a good den not desirably located, they may cover a larger territory."[133]

Gestation

The period of gestation was definitely fixed by Dr. Wm. A. Conklin at 13 weeks or 91 days[134] and by observations in the London Zoo, at 97 days.[135] These are the extremes of variation.

Young have been recorded born, or due to be born, on the following

[132] Forest & Stream, Sept. 19, 1914, p. 364.

[133] Watched, p. 193.

[134] Mamm. Ad., p. 35.

[135] Proc. Zoöl. Soc., London, 1832, p. 62.

dates: Jan. 10, Feb. 10, March 15, and June (Roosevelt), Aug. and Sept. (by reckoning backward from Steve Elkins' account, *Field & Stream*, Dec., 1918, p. 616). In Washington Zoo, Jan. 31, April 4, April 16, April 21, April 30, Sept. 24.[136]

If we reckon 13 weeks back from these dates we have the mating seasons Oct. 11, Nov. 12, Dec. 15, March, May, June, Nov. 2, Jan. 4, Jan. 16, Jan. 21, Jan. 30, June 26, which shows that the breeding season may be at any time, and does not definitely settle anything. Fortunately, we have some direct evidence, as will be seen later.

Frank E. Brown writes that on Feb. 6, 1912, on the Clearwater, Ida., he shot a Cougar that had in her "4 perfectly formed young about the size of half-grown mice, proving, in this case, that mating must have taken place in January."[137]

Den

The den, lair, or ledge of the Cougar, granting freedom of choice, is always in a cave.

"The dens of this species are generally near the mouth of some cave in the rocks, where the animal's lair is just far enough inside to be out of the rain; and not in this respect like the dens of the Bear, which are sometimes ten or twelve yards from the opening of a large crack or fissure in the rocks. In the Southern States, where there are no caves or rocks, the lair of the Cougar is generally in a very dense thicket or in a canebrake. It is a rude sort of bed of sticks, weeds, leaves, and grasses or mosses, and where the canes arch over it; as they are evergreen, their long pointed leaves turn the rain at all seasons of the year."[138]

But the most complete description of all is by our old friend Grizzly Adams, whose accounts have stood the critical storms of many years. As his book is rare and little known, I give his story in full. The season was spring, and the place, Humboldt Mountains, Nev.

"Our watch, therefore, convinced us of the presence of many beasts; but it was impossible to see where they retired, and we knew not how to proceed to hunt them. As we were thinking this matter over, however, one of the Indians announced that he had discovered a Panther's den, where there were young ones, and described it as being about a mile farther down the cañon, in a spot very difficult of access. Upon questioning him, I perceived that he understood the signs and proofs of the brute nearly as well as myself; and we resolved to proceed at once to the place.

[136] W. H. Blackburne, personal letter.

[137] In the Open, Aug., 1912, p. 20.

[138] Q. N. A., II, p. 311.

"The road was one of the utmost difficulty, on account of the thick brush, precipices, ledges, and rocks which were piled together in great confusion the whole way. In some places we had to let ourselves down, at the risk of breaking our necks, from one shelf of rock to another; and the place itself, as we found upon reaching it, was of most gloomy description but exactly calculated for the dens of ferocious beasts. It seemed a perfect Golgotha of the animal creation; for the bones of Deer, Antelopes, Wolves, Coyotes, and birds, together with feathers and hair, lay scattered about in every direction. Some of the bones were yellow with freshness, others perfectly bleached, and many crumbling with age. The place, indeed, bore the appearance of having been the den of beasts since the days of Methuselah. After viewing the premises attentively, we came to the conclusion that a particular horizontal opening in a ledge of rocks led to an immense den; and we determined to await the pleasure of the inmates to come forth. We accordingly posted ourselves, Gray and an Indian at one place, and I and an Indian at another, within 50 yards of the den, and in such positions as to have fair aim and be able to assist each other if necessary."[139]

The great piles of bones are evidence of the Panther's continued loyalty to his home den. Shoemaker says: "Panthers insisted on returning to spots where they had reared their young the season before."[140] And again: "Clem Herlacher learned of these Panthers and discovered their 'ledge' in the early summer of 1892. He abstracted 4 pups which were about 3 or 4 months old. Returning the following year he found 2 pups in the same nest, which also he carried away."[141]

H. W. Shoemaker writes me that in the summer of 1897, he saw one of these cubs, which was on exhibition in Herlacher's Barber Shop, Loganton, Clinton County, Pa. "The hide was faded, but the spots were clearly discernible."

Jay C. Bruce, the California Lion-hunter, gives the following interesting details.

"After trailing about three hours, during which time the Lioness had made several unsuccessful attempts to kill a Deer, the trail finally led to the carcass of a doe which was partly devoured as it had been killed several days earlier. From here the Lioness went up the mountain, circling round a bluff of rocks. On the upper side, atop of the bluff, the trail apparently ended, for the Lioness had jumped down over a ledge and worked down the bluff to her lair. After circling for about 10 minutes without locating the trail the

[139] Adv. J. C. Adams, pp. 246–7.

[140] Penn. Lion., p. 24.

[141] As above, p. 34.

Dogs winded the lair and soon located it. The mother Lion was in the lair with the 3 kittens.

"After some difficulty I succeeded in shooting the mother Lion in her lair and then captured the 3 kittens which were about 10 days old, I should judge.

"The lair was about 6 feet long and 2 feet wide. The nest was bedded with pine needles, probably carried in the den by Wood-rats for their nests at some time. There was also a small opening, perhaps 8 inches in diameter, through which the sun would shine on the kittens in the nest."[142]

Young

With many animals which pair, it is usual for the female to prepare the nest in the den, and in some way notify the male to live elsewhere as soon as she feels her time drawing near. Probably this is the case with the Cougar, for just before the birth of the young, and for some days after at least, she is always found alone in the den.

The young are born, according to various records already noted, at any time, but usually in midwinter or early spring. They number 1 to 4 and in rare cases 5 at a birth. Grizzly Adams found 5 kittens in one den.[143] The usual number is 2. Dr. W. A. Conklin of Central Park Zoo gives the 7 successive broods of one Texan Panther there at 4, 4, 2, 4, 3, 2, 1. Their eyes are closed at birth as with other Cats, and continue so for 8 or 9 days.

They cut their first teeth in 18 or 20 days. The young often die during teething, according to old Pennsylvania hunters.

When they arrive they are covered with fine yellow-brown hair elaborately spotted with black, as shown in the photographs. (Pl. XVI.) These spots are usually lost when the cub is 6 months old; but John Fannin records some exceptions. He says:[144] Two young which he received about a year ago could not be over 2 months old, and yet had *no spots;* "and again I handled one about a year and a half old which showed the spots quite plainly."

The mother is wholly devoted to her young, as with most of the Cats. She guards and fondles them unceasingly, carrying them about in her mouth, if it is necessary to move them.

William H. Blackburne, the experienced head-keeper of the National Zoo, has given me the following valuable information on the early family life of the Cougar in captivity, referring chiefly to an affectionate female that he had tamed. She was quartered by herself that winter with a small den

[142] Cal. F. & G., July, 1918, pp. 152–3.

[143] Adv. J. C. Adams, p. 258.

[144] Forest & Stream, Mar. 6, 1897, p. 184.

box on the inside of the cage. Here she bore cubs about the latter part of November.

"Every time I would approach the cage," he says, "she would leave the cubs, come to the bars to be petted, then go into the den, come right out, and back and forth. I thought she wanted me to see her little ones, which were then 6 days old, so I ventured in and she seemed pleased. I sat down and took the cubs into my lap to see their sex—3 males, 1 female. During that time, she purred and rubbed against my face and shoulders, and was not the least bit alarmed at my handling of the cubs. They were then blind; their eyes partly opened on the 9th day, merely cracked, but were fully opened on the afternoon of the 10th day.

"When the cubs were 7 weeks old, they were able to crawl out of the box and waddle about the cage. At 9 weeks old, they began to pay attention to the meat, or one might rather say, annoy their mother while she was eating it; for she always carried her ration into the den box and ate it there.

"A few days later, she called them when she got her meat and laid it down, licked the meat, and then licked the cubs. She tumbled them over with her tongue as they would crawl to her head, and she would continue to lick the meat and then the cubs. Finally, she finished the meal, then gave the cubs a cleaning; she lay down and the cubs went to nursing.

"On the 3d day afterward, that is when they were about 10 weeks old, she called the cubs, laid the meat down, purred and uttered a few very faint meows that could not be heard 15 feet away. Then when the cubs became interested in the meat, she walked off and lay down in the far corner. The cubs began to pull and suck at the edges of the chunk, but did not tear off any meat that I could see. But they learned what it was and what it was good for.

"At 3 months old, they were separated from the mother at feeding time, given a small portion of ground meat, and also a large bone without any meat on it—a bone they could lay hold of, and tug at to help cut their teeth. As they became stronger and their teeth longer, ground-up pigeon with entrails, feathers, and legbones removed, was given three times weekly. You seldom see Cougar cubs raised in captivity, and when you do chance to see them, they are rarely perfect—they have crooked backs or legs. I blame poor feeding for much of this. So few keepers seem to know that soft bone, either from pigeons or with ground meat, is what builds up the cubs of any feline; it prevents rickets and goitre.

"At 4 months old, the cubs were fully weaned. They were ready to fight each other over their food. They did not seem contented to sit and

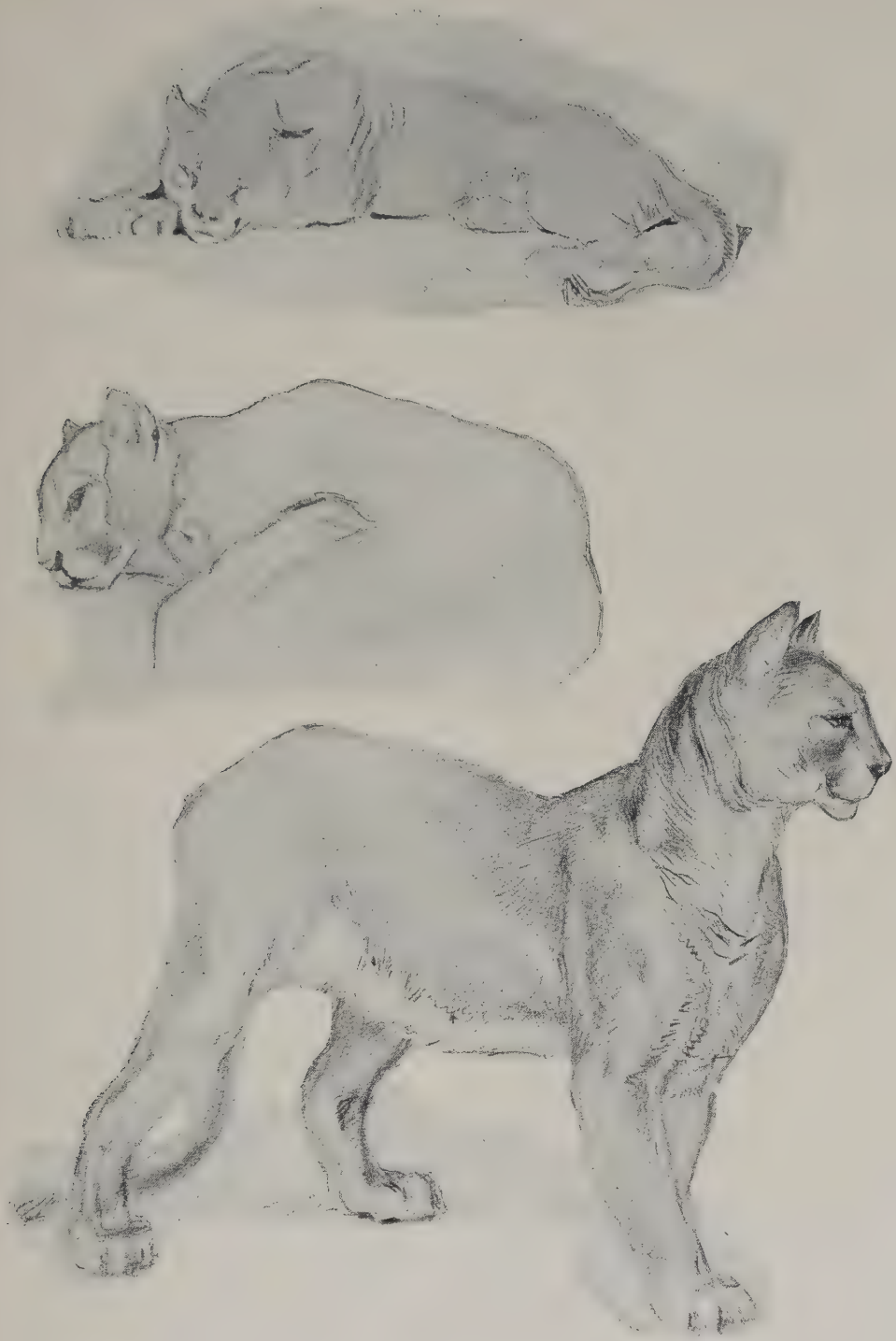

PLATE X.—LIFE STUDIES
By E. T. Seton, 1886, 1889, 1890

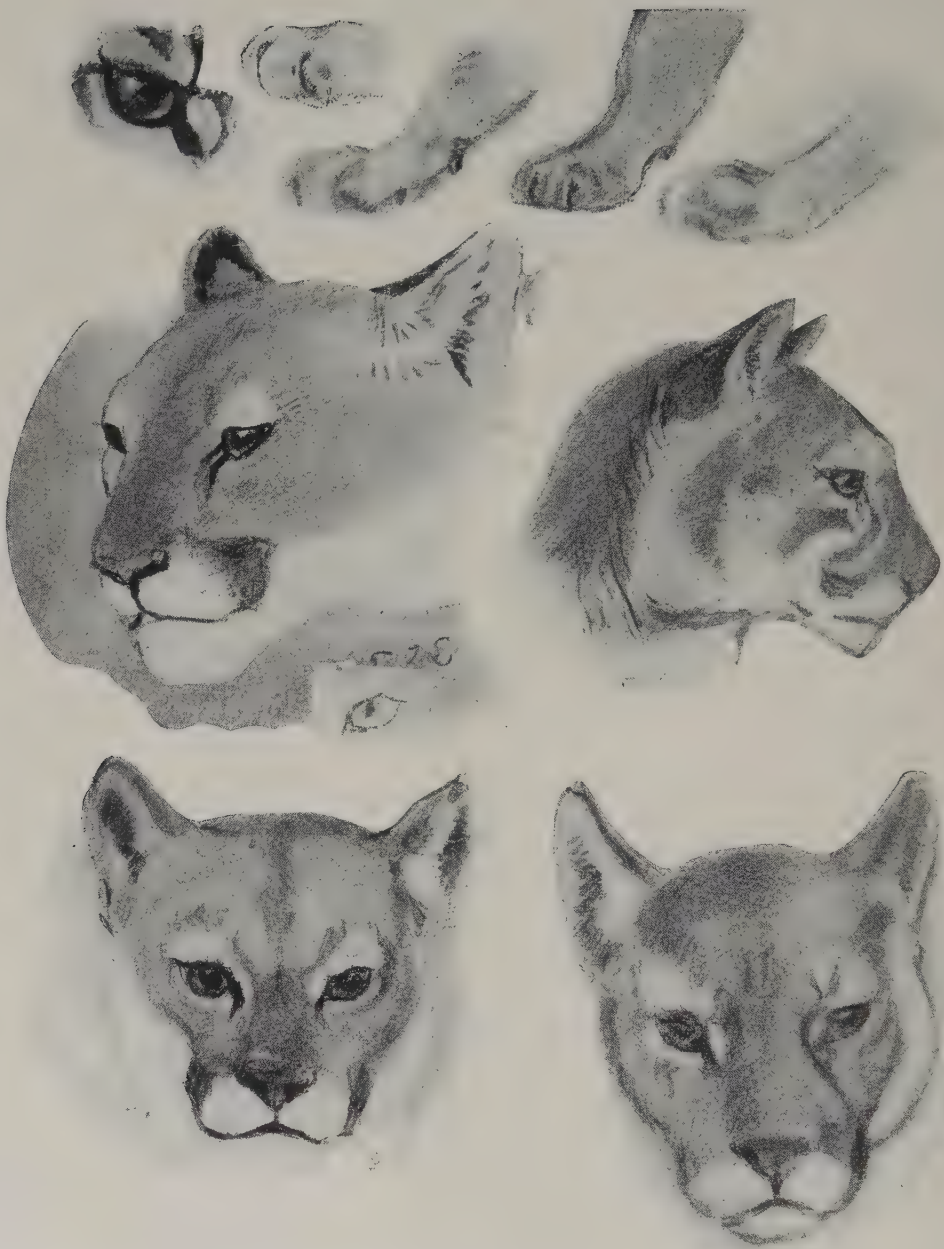

PLATE XIV.—COUGAR STUDIES IN CENTRAL PARK ZOO, N. Y.
By E. T. Seton, 1885–1889

eat their share, but would grab a mouthful, then start jumping about the cage, growling and spitting at each other.

"I think, without doubt, young Cougars have the least sense of any of the large Cats and are the hardest to raise. They use such poor judgment in jumping or romping about the cage. They start off without gauging distances or obstacles, or knowing how or where they are going to land."[145]

At 3 to 4 months usually, the wild ones are weaned, but they continue under the mother's care. She will go hunting for miles, kill a Deer, then go back and lead the young ones to it. It is generally believed that when a Panther's kill is buried or carefully concealed, it means it was the work of a mother who will soon be back with her cubs.

They continue with the mother until they have learned to hunt for themselves, and this may mean 6 months, may mean well over a year, or even in some cases till they are 2 years old. In which case the mother breeds only every other year.

Harold C. Bryant is responsible for the statement that "Young of two sizes have often been seen with the mother."[146]

The Father's Part

And where was the father all this time? Philandering with other mates, or wasting his energies pursuing the family that he may wreak his unnatural diabolic hate on them, destroy and devour them, for displacing him in the mother's affections, as one or two writers would have us believe?

From a multitude of witnesses I select one or two, and give condensations of their stories, prefacing them with the only dissonant note that I can find on good authority—no less than Col. Theodore Roosevelt, who says: "The mother lives entirely *alone with the kittens while they are small.* As the males fight so fiercely among themselves, it may be that the old he-Cougars kill the young of their own sex. A ranchman whom I knew once found the body of a young male Cougar which had evidently been killed by an old one, but I cannot say whether or not this was *an exceptional case.*"[147]

I have italicized the words which make the paragraph an answer to itself.

O. O. Smith of Fredonia, N. Y., a well-known observer, went fishing on the Pilchuck River in the Cascades of Washington in June some years ago, when he had the luck to find wandering in the woods a Cougar cub, "not over a foot in length." He caught it, and wrapping it up in his coat, made

[145] Letter, Sept. 24, 1923.

[146] Cal. F. & G., Oct., 1917, p. 161.

[147] Scribner's, Nov., 1901, pp. 548–49.

off, but soon found himself pursued by *two* full-grown Cougars who came to rescue their young one. He killed the mother, but the other adult carried off the young one safely and with evident affection.

The story is set forth with very full detail in *Forest & Stream*, Nov. 14, 1908, pp. 770–71.

James Fullerton, the veteran hunter of Wyoming, tells of a man who saw two Cougar cubs in the woods of Idaho in 1884. He tried to catch them. "Their calls were heard and answered not by one, but by two Lions—a male and female," who attacked the man in defense of the cubs, presumably their own. The incident is given fully in the section on "Cougar Attacks."[148]

R. H. Billings tells of killing a pair of Cougars, "evidently mates," in the Kootenay Lake country at the beginning of winter, then "had not gone more than a hundred yards when I saw four more smaller ones; two of them were playing like a couple of kittens."[149]

"A Puma was killed on the Rio Bravo, between Fort Duncan and Laredo. It was full grown and of considerable size, measuring from the nose to the insertion of the tail nearly 4 feet. This one was the head of a family, consisting of himself, a mother and 2 young ones. During his struggle with the hunters and Dogs he raised a terrible cry, twice or thrice, to express his rage, and perhaps also to give to his family the notice of danger. The latter seemed to have retreated immediately after hearing the warning, as the hunters, after despatching the old one, could trace the fresh tracks of both the mother and the 2 young going down on the river side."[150]

As fully noted in the Life of the Blacktail Deer, C. Greenwood of Chehalis, Wash., describes the hunting of a Deer by 4 Cougars—2 little ones and 2 big ones. If this was not a family group, and an ideal one, it was a miscount or an optical illusion.[151]

But the most complete account and delightful picture is offered by Old Grizzly Adams, who lay hidden with a companion to watch for the owners of the den already described. I never heard any one question Adams's reliability, so I give his account in full; believing it a sufficient answer to those who charge the Cougar with all manner of unnatural vices and credit it with no virtues at all.

"It was about sundown when we took our positions, and we had not waited long before I had the pleasure of seeing two Panthers come out of the cleft of rocks. They played with each other, wrestled and caressed, and I

[148] Sports Afield, Sept., 1913, p. 215.

[149] Field & Stream, April, 1918, p. 1012 and p. 1014.

[150] A. Schott: Mamm. Mex. Bd., p. 6.

[151] Recreation, June, 1899, p. 470.

soon saw that one was a male and the other a female. Never in my life before had I seen two large beasts play so prettily, and I therefore watched them without disturbing their gambols. In a few minutes afterward, 3 small kittens came out of the cleft and commenced playing, also springing upon their parents' backs and off again, and growling with pleasure. I could have watched a long time, but the opportunity being too favourable to be neglected, I drew my rifle, and, giving a whistle as the signal agreed upon with Gray, fired at the female and pierced her through the heart. Gray also fired, but unfortunately at the same animal, so that the male remained unscathed. He could not see us, however, and, being confounded by the unaccustomed sound, did not fly, but pranced about, jumping over the dead body of his consort, looking in every direction and screeching every few minutes. I reloaded as quickly as possible and fired a second shot, but without the fatal effect of the former one. The beast was, however, struck; and making a tremendous spring he bounded in the direction of Gray. I thought he was springing for my comrade; and in an instant, drawing my knife and uttering the loudest yell that ever passed my lips, I rushed forward; but the Panther was only scared, for, passing by them, he bounded over a cliff into the bushes out of sight, and this was the last we ever saw of him.

"After waiting until his screeches had died away in the distance, we approached the den for the purpose of securing the little ones; but they evaded all our efforts. We used our buckskin coats to throw over them, but they dodged and jumped with such rapidity that our endeavours were useless; when we thought we had them surely, they were not there; and finally they ran into the den and buried themselves in its recesses."[152]

The Mother's Love

The mother Panther's love, like the mother Cat's love, is proverbial. It is, indeed, the climax and measure of heroic devotion. This is the opinion of the hunters who know the creature best, and the Panther might well have inspired the lines by Sir Walter Scott:

> Like Mountain Cat that guards her young
> Full at Fitz-James's throat he sprung.

The case related by Roosevelt when the mother fled before the Dogs, leaving her 3 kittens to be destroyed by the pack, is strange and exceptional. It was, of course, a mere assumption that they were her own young ones.

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[152] Adv. of J. C. Adams, pp. 247–49.

Again he says: "A she-Cougar does not often attempt to avenge the loss of her young, but sometimes she does. A remarkable instance of the kind happened to my friend, Prof. John Bache McMaster, in 1875. He was camped near the head of Green River, Wyo. One afternoon he found a couple of Cougar kittens and took them into camp; they were clumsy, playful, friendly little creatures. The next afternoon he remained in camp with the cook. Happening to look up he suddenly spied the mother Cougar running noiselessly down on them, her eyes glaring and tail twitching. Snatching up his rifle, he killed her when she was barely 20 yards distant."[153]

Bachman says: "The female Cougar is a most affectionate mother and will not leave her young cubs, unless occasionally to procure food to support her own strength; she therefore often becomes very lean and poor. The female we have figured was in this condition; we procured one of her cubs and figured it, presenting its beautiful spots, seldom before noticed. The other made its escape.

"The whelps are suckled by the dam until about half grown, and then hunt with the old ones (which generally go in pairs) until the mother is with young again, or the young ones find mates for themselves and begin to breed."[154]

Thus we have abundant evidence of the mother's effective care for her young, attested by many witnesses.

Probably the noblest height of mother love and devotion is seen in the episode recorded by Ed. G. W. Ferguson.[155]

"A fight between a Grizzly-bear and female Mountain Lion was witnessed by two miners who were working a placer claim near Murray, Ida. The female, with her kittens, had her lair near the top of an almost precipitous barren hill. The men knew she was there because they had frequently heard her and once or twice caught fleeting glimpses of her as she moved among the rocks. One afternoon one of them noticed a large Bear travelling along the top of the ridge on his way to the valley below. His course was such that he would pass directly in front of the Lion's lair. They stopped their work and watched.

"The Bear peacefully ambled along evidently unconscious of the Lion's presence when, as he approached the pile of rock where her kittens were hidden, the Lion suddenly appeared. She might just as well have remained hidden, and if she had, the Bear would without doubt have gone on his way in peace. But she didn't, the watchers saw a dark body shoot out

[153] Wilderness Hunter, p. 346.

[154] Q. N. A., II, p. 312.

[155] Field & Stream, Oct., 1914, p. 612.

and with one long leap land square on the Bear's back. The surprised brute reared and tried to throw her off; he frantically clawed the air and tried to reach her; then he rolled on the ground; the Lion let go and with another spring was at his throat. The animals were too far away for the watchers to closely observe the details of the fight, but it must have been interesting while it lasted.

"As it was, they thrashed about, and finally, locked in each other's embrace, they rolled over the edge and tumbled down the hillside, over and over into the gulch below.

"The miners found them in the creek bed, both dead, with almost every bone broken. The Lion was hanging by her teeth to the Bear's cheek, his throat and back were torn and lacerated, and his belly hide ripped into ribbons, mute evidence of the fact that all her 4 paws with their 18 sharp claws had not been idle.

"The kittens were later captured, but only one lived and he was sold to a menagerie."

Age

What age does a Cougar attain? Zane Grey tells of a specimen known as "Old Tom" that had been king of the Grand Canyon for 12 years.[156]

In the Central Park Zoo, New York, according to Dr. W. A. Conklin, there was a female Texan Panther that lived there 16 years, producing 7 litters in that time, or 20 cubs in all.[157]

There is an account of a Mountain Lion killed by Ray Pass of Huntsville, Utah, after a career of destruction not less than 10 years long and some said of 20 years in those mountains.[158]

Cougars in the Washington Zoo, adult when they came, have lived to be 7 years and 2 months old, 7 years and $2\frac{1}{2}$ months, $11\frac{1}{2}$ years, $8\frac{1}{4}$ years, 6 years and 5 months.

Dr. P. Chalmers Mitchell kept one in the London Zoo till it had reached the age of 10 years and 4 months.[159]

Henry W. Shoemaker, after much study of the matter, is of the opinion that the wild Panther may have a normal life of 20 years, and writes me that J. Ernest of Youngdale, Pa., knew one that came through Daguscahonda, Elk County, "every spring for nearly 20 years, remaining a few days, then moving on. The natives missed it when it stopped coming about 1890."

[156] Everybody's Mag., June, 1908, p. 776.

[157] Mamm. Ad., p. 35.

[158] Forest & Stream, July 29, 1911, p. 176.

[159] A. B. Baker, personal information.

The last chapter in the life of an aged Cougar was told me thus by John B. Goff of Meeker, Colo.

In the February of 1900, he and a Mr. Basil from West Virginia had followed the trail of an unusually large Cougar for 36 hours. The track was of the largest size which meant, of course, a large animal, but they found several places where it had stalked a Deer and failed to get it on the final spring. All of which told a story of failing powers—of advanced age.

At length the Dogs overtook and treed him; he was the largest, thinnest Cougar that Goff ever saw. He could not have weighed over 110 or 115 pounds.

When Goff came near the tree the cranky disposition of the very old Cougar showed up strong. Ignoring the Dogs it gave every evidence of gathering its legs under it to spring at the man, threatening him with looks and snarls, and waiting only till he came within reach; it seemed crazy with rage.

But Goff took no chances. He dropped the beast with a single shot of his rifle.

The gaunt old fellow was not only hungry and starving, but his stomach contained a mass of squirming whitish worms, in total bulk as big as two fists.

This was the only time Goff ever felt that he was in danger of actual attack from a Cougar, and he maintains his belief that as soon as within reach, that desperate old fellow would have sprung on the hunter, and at least have had the satisfaction of a fighting finish to a long sporting life.

Powers

Most anatomists take the common Cat as the model of bony and muscular perfection. "Active as a Cat" is an established measure of physical fitness. There is not on earth a creature of the size that is better equipped in point of agility, muscular control, weapons, and—shall I add?—personal prowess, sheer fortitude. These ideas, I believe, need no proof; they are among the recorded things that have been proven a thousand times. Let us then remember that our Cougar is in all physical respects a Cat, simply a Cat multiplied by 20. A literal application of this measure shows that it is justified in all matters dealing with muscular strength; while as to agility, since the Cat represents perfection, the Cougar can do no better.

There is, however, a certain modification that must be made of the general statement that sets the Cougar in the forefront of all athletes in our woods. There can be little doubt that the Deer, especially the Whitetailed Deer, is the speediest of all the native woodland creatures that run on four

legs. If it were not so, the Cougar and the Wolves would have wiped them out these many æons back.

Even deep soft snow does not leave them entirely at the mercy of their foes. But when deep snow is rendered deadly by a sharp thin crust, it is another story and an evil day for the Deer.

"Under certain conditions of the deep snows," says Merriam, "the Deer cut in so deeply that the poor animals can make but slow progress. At such times, a Panther, by spreading the toes of his great broad paws, simulates a man on snowshoes and sinks but a short distance in the snow. He thus gains a vital advantage over his prey and will now give chase to and capture one that he missed on his first spring. Under no other circumstances will a Panther pursue a Deer, for he is too well aware of the uselessness of an attempt to overtake so fleet an animal."[160]

Speed. Roosevelt says: "It was astonishing to see the speed of the Cougar. He ran considerably more than a quarter of a mile downhill, and at the end of it, had left the Dogs more than 100 yards behind."[161]

Charles J. Lisle's description of the Cougar's speed is the best thing of the kind I know. He tells thus of the chase: "Bursting over the little knoll directly ahead of us they came; a long, lithe beast, like a silvery brown shadow, that travelled in unbelievably long leaps, was the first to come to view. I do not think it saw us; but it had run a long ways—far longer than a Cougar will usually travel ahead of a pack of hounds—and it was due to take to a tree.

. . . . . .

"As we came within perhaps 100 yards, the smaller [Cougar] sprang from the tree into the midst of the pack. They saw it coming and tried to reach it as it lit. But it sprang farther than the circle of Dogs, and then took off into the forest at an amazing rate of speed, the Dogs hot on the trail, but left far behind. Some of its leaps were 30 feet, as we measured them; one, downhill, was fully 40 feet from the take-off to where it ended. I do not believe there is any other creature on earth that has such speed as a Cougar for a short distance."[162]

Spring. The fateful spring of the Cougar at the climax of his hunt is, of course, his best effort. Of this Merriam says: "The distance that a Panther can pass over in a single leap is almost incredible. On level ground a single spring of 20 feet is by no means uncommon, and on one occasion Mr. Sheppard measured a leap, over snow, of nearly 40 feet. In this instance

[160] Mamm. Ad., p. 32.

[161] Scribner's, Nov., 1901, p. 562.

[162] Field & Stream, Jan. 9, 1915, p. 933.

there were 3 preliminary springs, and the Panther struck his Deer on the fourth. The longest leap measured by Mr. Sheppard was one 60 feet, but here the Panther jumped from a ledge of rocks about 20 feet above the level upon which the Deer was standing. He struck it with such force as to knock it nearly a rod farther off."[163]

In the Trees. Although the Cougar is perfectly at home in a tree when he chooses to climb, he rarely does so, except when driven up by a pack of Dogs. While quite young the cubs are known to scramble about among the branches in play, and there are one or two records of Cougars taking a nap as they crouched on some big limb not too high up; but these are rare, and the species must be considered a ground or rocky hillside loving animal.

Swimming. The Cougar shows little fear of water. Indeed, he crosses it, lake or river, fast or slow, summer or winter, whenever it suits his purpose to get to the other side. O. O. Smith describes the plunge of the mother Cougar into the icy Pilchuck to come to the rescue of her cub;[164] and J. C. Hughes of New Westminster, B. C., says he knew of 2 Panthers killed while crossing the Fraser River where it was nearly a mile wide.[165]

H. G. Hayes, telling of his hunt after a wounded Cougar, one of whose eyes was shot out, says: "The Lion headed straight for the river, a swift mountain stream about 35 yards across, and too deep and swift for man or Horse to ford. But it swam directly across."[166] Dr. N. Hollister tells me that in Louisiana the Cougars took to the water whenever it was in their line of travel, quite as readily, indeed, as Deer.

Endurance. Merriam tells of Panther chases in the Adirondacks that lasted many days or sometimes weeks.

H. G. Hayes hunted one with Dogs for 6 days before he got it, although it was wounded and blind of an eye. It lived on the country as it travelled.[167]

Shoemaker speaks of a hunter who followed the Panther for nearly 2 months before he brought it to bay.[168]

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[163] Mamm. Ad., pp. 31–32.

[164] Forest & Stream, Nov. 14, 1908, p. 770.

[165] As above, Sept. 6, 1883, p. 103.

[166] As above, July, 1917, p. 306.

[167] As above.

[168] Penn. Lion, p. 39.

When the King-cat Goes A-hunting

Of all the beasts that roam America's woods, the Cougar is the big-game hunter without a peer. Built with the maximum power, speed, and endurance that can be jammed into his 150 pounds of lithe and splendid beasthood, his daily routine is a march of stirring athletic events that not another creature—in America, at least—can hope to equal.

The map of his range fits very exactly into that of the Whitetailed Deer and its kin; in colour he matches the Deer closely, doubtless to mislead the Deer if it chance to see him, and this is unquestionably his ideal and favourite prey.

There are a few—very few—records of a Cougar lying in hiding by a water-hole or on a runway, waiting cat-like for some heedless, hapless Deer to amble within the fatal circle of his amazing spring.

James Fullerton tells of two instances that he observed when the Cougar lurked in a high ambush and both times got a Deer.[169] (See also section on "Patience," p. 102.) But there can be little question that the finest kind of hunting, the still hunt, the match of wits with wits and, for a finish, power with power, is the Cougar's method—the one by which nine tenths, at least, of his prey is taken.

Leaving the high ledge where he has sprawled in the sunlight, he sets forth at nightfall to cruise in great sweeping circuits through the woods of his own vast range, exactly as a man would do, only he moves far faster, goes farther, and covers the ground in the silence that in many parts of the West has won for him the name of Sneak-cat.

But this great difference there is between the two still-hunters: The man watches chiefly the ground and the distance, the Cougar studies the wind. The scent of a fresh track is ever helpful, but the real body-scent on the wind is the proof he chiefly seeks. That tells him better than eyes or ears that close at hand is the choicest of all game. Now begins the slow, stealthy approach, directly up wind, not so they cannot smell him but so he can smell them—which serves the same end—he has the wind. Their keen nostrils sound no alarm to the unconscious Deer.

Gliding like a shadow he goes, under or along logs and fallen trees, around dry, leafy places or brittle twig heaps that might snap and rustle, making

[169] Sports Afield, Sept., 1913, pp. 215–16.

long pauses to study out some outline in the gloom, going back or around some place of poor approach. Waiting for half an hour, if need be, till the faint murmuring or grinding sound of feeding Deer is renewed, he nearer crawls, makes sure of their being there, takes in the setting and estimates the advantage of this or that take-off; backs slowly away, it may be, to approach at another angle, that will lead him to a leap 10 feet above the Deer. Again consumes a small eternity to get there; then, flatter than a sawmill slab, he lies on the rock, gazing intently in the gloom, focussing all his power of glare to single out a Deer, to cut it clean from its background.

If there be two to pick from, the one without horns is his choice, or the nearer, or one that stands or lies clear away from any threatening snags. Hastily he computes that he can make it in one, two, or three fast bounds. If more than one, his first must reach that rock, his next that log, and then the Deer and the hunter's joy.

He gathers his legs below him for the spring, up-bows his back, tries the footing for each paw till it is firm and smooth, then hurls himself with one vast silent bound, strikes the flat rock with scarcely a sound, and flashes through the night.

But the Deer, alert, have heard him. They spring to their feet, are up and away. But he is under full headway, they are hardly up as he lands on the hindmost spikebuck, strikes him to the ground with his own projectile weight, and drives 8 talons deep in his flanks and 4 long white fangs in the rounded neck, jerks back with mighty paw the long slim nose till the neck bone cracks, the buck sinks down, and the Panther purrs as he laps the gurgling blood. In a moment it is over, not three seconds' suffering had the buck. And the Panther drinks his red wassail and riots in the hot feasting, ripping open the belly to devour first the liver, then the hindquarters and, however hungry he be, avoiding the head.

It may be he missed in that first stalk and dash. Yes, he often misses. The Deer are keen, alert, trained by the Panther himself to avoid him.

Some think that in not one out of three attempts does the hunter make his kill. Then he has the joy of another hunt and another brave attempt; that too may fail, and so the night may pass in failures. It often happens that in such a case he can go back to where he buried the remnant of a former hunt, or he can look for a lesser prey, or, last, he can suffer the pangs of hunger till another night arrive with better luck.

Many a Deer escapes even after struck, for snags and saplings happen in between. The Panther's foot may slip, the Deer may get a better start than he. A score of things may spoil the final scene. Proof of this is seen

in the many Deer that are found with scratches of the Panther's claws in their flanks or rear.

It is generally conceded that the female is the better hunter of the two, partly because she hunts harder and more persistently, and partly because she is.

If she and her spouse happen to be hunting together, of course, they feast together at the moment of triumph. But more often she is out hunting for her family, and as soon as the victim is certainly dead, she drags it off into some secluded spot and carefully covers it up with earth, brush, and grass. Then she hies her away to the den where she left her brood; calls them, just as a Cat calls her kits, and leads them with marvellous directness to the very spot of the kill, and looks on with joy and watchfulness as they fill their little bellies and growl little growls at each other, till the bones of the victim are cleaned, or the Cougarlets are stuffed so they cannot eat another bite.

If still there is food on the table and Mother has fed, she covers it up again—a store for a rainy day. Although burying the kill is supposed to be the female's peculiar trick, Dan J. Singer reports a male Cougar doing this in Sonora.[170] It is also proof that the killer means to return soon for another meal and is at that moment not more than a mile at farthest from the spot. This interesting fact is commonly turned to account by the wise sportsman. In the present case, the result was that Dan Singer took the pelt back East with him when he went.

One meal a day seems to be the rule of the Cougar family, and next dinner-time commonly sees the still-hunter back at his kill, for he usually makes meal after meal till the whole of it is devoured, unlike some other sportsmen whose names need not be mentioned.

Storing Food

All observers agree that the Cougar habitually buries for future use the portion of his kill that he could not eat at the first grand banquet.

Azara gives us details of a more complete storage habit. He kept a young male for 4 years as a household pet, according to Hudson. This animal, "would not refuse any food offered to it; but when not hungry it would bury the meat in the sand, and when inclined to eat dig it up and, taking it to the water-trough, wash it clean."[171]

An extraordinary illustration of the storage habit is seen in the following adventure related by Alwin Frache of Waneta, B. C. During a hunting trip in the mountains, he took an afternoon nap. In his own words:

[170] Field & Stream, March, 1912, p. 1098.

[171] Nat. La Plata, p. 40.

"It could not have been more than an hour before I awoke, but my first impression was that night had fallen, for I was in absolute darkness. My movements caused a great rustling and not until I rose to a sitting posture did my head emerge from the heap of leaves with which I had been covered. After finding my gun and pipe I sat down to think the business over. I finally concluded I had been cached for future use by some animal, and I determined to see the adventure through.

"I piled sticks and brush into a heap about the size of a man and covered them with the leaves. Then I shinned a tree close by and, sitting astride a branch, made sure there was nothing wrong with the action of my Savage.

"It was just as well that I awoke when I did, for I had been but a short time in the tree when a large female Cougar appeared, followed by 2 half-grown kittens. Going straight to the pile of leaves, she circled it several times, crouching and apparently selecting a good place to spring from. When she made the leap she went through the air like a flash, scattering the leaves in a whirlwind and scratching and snarling. When she had cleared the ground without finding what she wanted, she did not stop to display disappointment. Instead she cast about, struck my scent and came direct to my tree." When, of course, the matter was settled with a rifle ball.[172]

An older record of the kind is furnished by Dr. W. J. McKnight. He gives an interesting history of "Bill Long" the Jefferson County, Penn., hunter, about 1803,[173] in which he narrates the following:

"When Long was still a young man, one day he went up the North Fork to hunt. About sundown he shot a Deer, and when he had it dressed there came up a heavy rain. Being forced to stay all night, he took the pelt and covered himself with it, and lay down under the bank to sleep. After midnight he awoke, and found himself covered with sticks and leaves. He knew at once this was the work of a Panther hunting food for her cubs, and that she would soon return. He therefore prepared a pitch-pine fagot, lit it, and hid the burning fagot under the bank and awaited the coming of the Panther. In a short time after this preparation was completed, the animal returned with her cubs, and when she was within about thirty feet of him, Long thrust his torch up and out, and when it blazed up brightly the Panther gave a yell and ran away."

Lest any should consider these experiences incredible and impossible, I refer them further to *Forest & Stream*, April, 1921, p. 165, in which Henry Bannon, the sportsman, ascribes an exactly parallel adventure to one Henry

[172] Recreation, Sept., 1902, p. xxix.

[173] Forest & Stream, Jan. 3, 1914, p. 5.

Utt, a hunter employed by the surveyors of the Virginia Military District in Ohio some hundred years ago. And Col. Henry W. Shoemaker writes me that the Pennsylvania hunters, Seth Nelson, James David, James DeLong, and others, had precisely similar experiences. They fell "asleep in the woods and were covered with leaves by Cougars."

The Trail of the Freebooter

From many hunting incidents that shed light or colour on this freebooter's life, I select the following from my scrapbooks and journals: On the night of Sept. 14, 1899, I was camped with my wife on the High Sierra in California near Barker's Creek, not far from Mount Tallac. It does not rain there at that season, so we had no tent, but each night rolled up in our blankets and slept on the ground about half a yard apart. During that night there was a great alarm among the Horses. They broke loose and stampeded. Next morning we learned the cause. A Cougar had come into camp, had prowled around us as we slept, so said the tracks, but had gone off without attempting to harm any of us.

That is as near as I ever got to a wild Cougar. And although I have seen their tracks and their work many times in the Sierra, the Colorado Rockies, the Yellowstone, and the Bitterroots of Idaho, I never had the luck to see the living animal, though I doubt not many a one has watched me.

In mid-September, 1902, while camped in the Bitterroots of Idaho, I found in the dust the tracks of a band of Mule Blacktail moving all one way. I followed for a time and found the track of a large Cougar joining on. After a quarter of a mile, I came on the fresh-killed body of a female Deer and in the woods near by were her two fawns running about. But they were big enough to take care of themselves and made off.

Later on, one of our party saw the Cougar but it calmly glided away keeping the trunk of a tree between itself and the rifleman.

On Jan. 27, 1914, I went on a Cougar hunt with Henry Anderson of Yellowstone Park. Our pack consisted of 2 trailing hounds and 2 Airedales—that is, 2 parts find and 2 parts fight. We rode over the slope of Mount Evarts past a dozen Bighorns, scores of Deer, hundreds of Antelope and thousands of Elk, but only one Cougar trail did we see: that was the big one we were after. At length we came on a large buck Blacktail just killed and partly devoured, but a driving snowstorm set in and ended all possibility of seeing, tracking, hearing, or shooting; so unwillingly we turned back to the Fort.

Early in the day we started a Coyote which showed the Dogs what "speeding-up" really meant and left them hopelessly behind though in

plain view for a mile or more. This led to the information that that Coyote was probably one of several that made a practice of following the Cougar around, so as to get what was left of his kill after he was gorged and elsewhere sleeping. Oftentimes, however, the Cougar is said to take his rest on some high perch where the scent does not betray him to creatures on the ground, and from such a place spring on the Coyote that heedlessly ventures too near.

The poisoners commonly use the Cougars' kill for a bait, and consider it a sure thing for Coyotes. Occasionally also they secure a Cougar in this unsportsmanlike way.

While camped in the Flattops of Colorado, Sept. 9, 1901, my guide, Charles Erickson, told me that a hunter he knew was stalking a band of Mule-deer in those hills. It was in the snow and he was dressed in white. When he had got barely within range the band scattered and ran furiously. One separated from the others and on its back was a Lion. After a short run it dropped dead and the hunter came up and shot the Lion as it was revelling in the spouting blood of its victim, probably with eyes shut.

The Whitetail Deer and its kin are so easily within the Cougar's power that one is not surprised to find them essaying much larger prey.

Hugh Johnson, the old-timer, says:[174]

"On North Platte River I was watching a band of Elk a little way off, waiting for them to get into a place where I could creep up and kill a heifer, for I needed meat. While I was watching, a Panther jumped out of the brush on to a cow and grabbed her by the neck with his teeth. She ran this way and that, butting into trees and brush and it seemed to me she was trying to scrape the Panther off. She kept moving so quickly, though, and the other Elk starting off made things so confused, that I could not see exactly what happened. In a minute everything was out of sight and I stepped along down to try to see what had happened, and I had not gone far when I saw the Elk lying on the ground and the Panther working at her throat. Of course, I killed him and got my meat."

In the Yellowstone Park the Cougar is the only beast of prey really dangerous to a full-grown Elk. In my Yellowstone Journal for 1914 I find this note: Henry Anderson, the guide in Yellowstone Park, followed the track of a Cougar last winter (1913) for 10 miles near Yancey's and found that he had killed and cached 3 cow Elk. In each case he had dragged the body as much as 150 yards to a good cover, and there had hidden it with brush and snow. These caches serve as food supply if famine comes, but also they commonly fall to the share of the Coyotes.

[174] Forest & Stream, Oct., 1907, p. 532.

In Dec., 1917, Steve Elkins went Lion-hunting near Yellowstone Park. In Hellroaring Canyon he found the remains of an Elk killed by Lions.

"Dec. 19th we found a fresh track and followed it a short distance and saw where the Lion had jumped on an Elk and they both went over a steep bank. When they hit the bottom the Elk went one way and the Lion another. I think the Elk must have fallen on the Lion and hurt him in some way, for this is the only time I ever saw an Elk or Deer get away from a Lion after having been caught. The Lion crossed the river, jumping from rock to rock, and one of my Dogs tried to follow the Lion and fell in and was washed under the ice and drowned."[175]

Abe Leeds, my guide in the Bitterroots of Idaho, 1902, tells me that in the early part of the winter, when the bulls have horns, the Lions prefer to attack only the does and fawns. He says that he once followed the track of a bull Elk that was followed by a Mountain Lion and came at length to the Elk bedded in the snow. He was a fine big fellow with huge antlers, and on a log 30 yards away he saw where the Lion had stood watching the unconscious Elk and calculating his chances; but evidently, impressed by the antlers, he had decided that he dared not attack such a formidable looking creature and had unwillingly sneaked off to find an easier prey.

From Elk it is but a step to Buffalo. The following paragraph from John D. Hunter's "Captivity among the Indians," 1823, p. 111, gives not only a stirring incident of wild life, but an amusing illustration of a simple hunter's story made ridiculous by a pompous editor who translated it into Johnsonian English, which is another name for mongrel Latin.

"The Buffaloes passed so near me on both sides, that I could have touched several of them merely by extending my arm. In the rear of the herd was one, on which a huge Panther had fixed, and was voraciously engaged in cutting off the muscles of its neck. I did not discover this circumstance till it had nearly passed beyond rifle-shot distance, when I discharged my piece and wounded the Panther. It instantly left its hold on the Buffalo, and bounded with great rapidity toward me. On witnessing the result of my shot, the apprehensions I suffered can scarcely be imagined."

The ravages that the Cougar makes among Horse herds are notorious. It is said that in the mountains no Horse can long escape the Cougars. So that it was with something like a little thrill of pleasure that I listened to an account of the wild Horses of the desert in the northwest part of Colorado on the Utah line, sometimes called the Yampah Plateau. This is a famous haven-land for wild life, or was when I camped near by in 1901. It abounded in mustangs among other noble rarities, and there they lived and throve in

[175] Field & Stream, Dec., 1918, p. 615.

spite of wild beasts and wilder men. They seemed to have an answer for all the big problems. According to my Journal of the time they cannot be lassoed because they take to the abundant brakes and cedar woods where roping is impossible. They cannot be run down, because it costs ten times more than they are worth and ruins your saddle stock as well as the victim. They do not fear the Wolves, for they keep in compact herds. They do not fear the snow, for they winter on the high ridges where the snow blows off, and the forage is good. And they do not fear the Cougars because the ever-watchful mares keep the keenest lookout. Sign or smell of a Cougar is enough to make them round up into a tight bunch with the colts in the middle, and not the boldest Cougar dare attack them. Only when some headstrong foolish broncho wanders off alone do the Cougars feast on Horse meat. Just as when a few winters ago a band of 8 head of Horses left the wind-swept ridges and wandered to a lake whose shore in summer furnished delectable forage. But alas, they were young, they knew nothing of deep snow, and floundering in the drifts, all died.

The Patience That Wins

The consummate, enduring patience of the questing Cougar is illustrated in these notes from Enos A. Mills's "Watched by Wild Animals," pp. 195–96:

"A friend wished a small blue Mule on me. It had been the man's vacation pack animal. The Mule loitered round, feeding on the abundant grass near my cabin. The first snow came. Twenty-four hours later the Mule was passing a boulder near my cabin when a Lion leaped upon him and throttled him. Tracks and scattered hair showed that the struggle had been intense though brief.

"Not a track led to the boulder upon which the Lion had lain in wait, and as the snow had fallen 24 or more hours before the tragedy, he must have been there at least 24 hours, and he may have waited twice as long.

"Another time I frightened a Lion from a cliff where he was waiting for a near-by flock of Bighorn Sheep to come within leaping distance. Though it was nearly 48 hours since snow had ceased falling, not a track led to the Lion's watching place or blind."

Heroism of the Cougar

Is the Cougar as brave as he is strong?

Like every creature treated in this book, he is described as cowardly by those who, without any personal risk, pursue and destroy him.

I do not think we should accuse the Cougar of cowardice because he

shuns the attack of many Dogs, backed by men armed with guns. He knows it is a ten-to-one fight—he has no chance. A better answer is found in this: the Cougar will face and fight to a finish any number of Dogs and is more than ready to try conclusion at any time with Wolf, Jaguar, Blackbear, or Grizzly. The fact that he continually avoids a clash with man is a remarkable circumstance discussed more fully later on.

In the section dealing with the mother Cougar's courage and devotion to her young, is related her battle with a Grizzly-bear. But such fortitude is not confined to the mother at the time of her maternal obsession.

From a considerable number of similar stories I select two to illustrate the Cougar as a mighty hunter of the biggest and most dangerous game we have. The first is by Hugh Johnson and appeared in *Forest & Stream*, Oct. 5, 1907, p. 533.

"I have heard people say that sometimes Panthers and Bears have big fights, and I have seen one or two Grizzlies killed that had fearful naked ridges on their backs that looked like long deep scars. I always believed that the Bears got these by fighting with other Bears, but of course, I never saw such a fight, and I never saw a fight between a Lion and a Bear.

"I was told something a good many years ago by a man who had been a great deal in the South, that interested me very much, and which, I think, is worth telling about. This man was Major Cremony. He had been a good deal in the Southwest, especially among the Apaches, and they said he could talk good Apache. He told me that once he and a couple of Apaches were out hunting down on the Pecos and came on the tracks of a big Lion and took the trail to look for it. They were following up this trail toward a rocky canyon where they thought a Lion might be found, when suddenly they heard a fearful noise coming from this canyon. As near as I could understand, it sounded a good deal like a Pig squealing or groaning. Major Cremony did not know what it was, and I judge the Indians did not either, but they crept up toward it, and what do you suppose they saw? There was a big Lion and a middle-sized brown Bear, and they seemed to be having a fight; not a regular rough-and-tumble, but the Lion seemed to be trying to kill the Bear. The Bear was standing on his hind-legs with his back against a big rock and was yelling bloody murder. The Lion was crouched on the ground about twelve or fifteen feet from the Bear. They waited there quite a while, the Lion in the position of a Cat about to spring, working his tail, with his ears laid back and getting ready for a jump as he moved his feet back and forward, as you will see a tomcat do. Once in a while he would growl. The Major and the Indians kept quiet and looked on. At last the Lion charged the Bear and grabbed him, and they both went

down together and the dust flew up so that it almost hid the two fighters. In a little while the Lion suddenly let go and sprang back to where he had been before. Both animals were bleeding and each was licking its wounds. The Bear kept up his moaning and screaming and would have been mighty glad to get away, but he did not dare to expose his back to the Lion. The two animals spent some time licking their wounds, but at last the Lion charged the Bear again, and this time with his claws he tore open the Bear's back, and his claws must have reached some deadly part, for presently the Bear fell over dead and the Lion went off to his old place and began to lick his wounds again. After a while he took hold of the Bear's carcass and began to drag it down the hill and to cover it up with leaves and brush, just as I expect you have often seen a Deer's carcass covered up by a Lion. While the Lion was at work doing this, one of the Indians killed him.

"This Major Cremony was a good man, and I believe he saw what he said he did, and from what he told about the way the Lion fought the Bear and the way he cut up its back, it may be that the scarred Bears that I have seen had got their scars in fighting Lions."

I have often been told of the Eastern Cougar attacking the Blackbear successfully, especially when the attacks were made by a pair. It is difficult to see how the Bear would have any show against such an attack, but this is the only case that I know of in which a single Cougar went out of his way to attack a Bear and apparently made a success of it.

The second is by W. H. Hudson, who says: "Azara states that it is generally believed in La Plata and Paraguay that the Puma attacks and conquers the Jaguar; but he did not credit what he heard, which was not strange, since he had already set the Puma down as a cowardly animal, because it does not attempt to harm man or child. Nevertheless, it is well known that where the two species inhabit the same district they are at enmity, the Puma being the persistent persecutor of the Jaguar, following and harassing it as a tyrant-bird harasses an eagle or hawk, moving about it with such rapidity as to confuse it, and, when an opportunity occurs, springing upon its back and inflicting terrible wounds with teeth and claws. Jaguars with scarred backs are frequently killed, and others, not long escaped from their tormentors, have been found so greatly lacerated that they were easily overcome by the hunters."[176]

The Two He Does Not Care to Meet

In the Cougar range there are two interesting wild things usually left unmolested. These are the Skunk and the Porcupine.

[176] Nat. La Plata, p. 35.

Youthful indiscretion is probably the explanation of the following breach of the rules:

"On Nov. 3, 1916, our Shepherd Dog treed a young California Lion a short distance below our ranch, near Coulterville, Mariposa County, California. My father, on approaching the Lion, which had taken refuge in a live-oak tree, noted an odour of Skunk. After the Lion had been killed the stomach was found to contain a half-chewed Skunk, a striped one, judging from the black and white hair found. The Lion was only a small one, weighing in the neighbourhood of 35 pounds."[177]

The Porcupine has ever been a dreadful problem for the big flesh-eaters.

"Cougars are either particularly fond of Porcupines, or else are frequently forced by hunger to make a distasteful meal, for certain it is that large numbers of these spiny beasts are destroyed by them. Indeed, it often happens that a Panther is killed whose mouth and lips, and sometimes other parts also, fairly bristle with the quills of this formidable rodent. Porcupines are such logy, sluggish creatures, that in their noctivagations they fall an easy prey to any animal that cares to meddle with them."[178]

They may be easily killed, but so far as known there are only two animals that can kill them with impunity: man and the Fisher.

Doctor DeKay says that he was told of a Cougar "in Warren County [New York] that resorted to a barn, from whence he was repeatedly dislodged and finally killed. He showed no fight whatever; his mouth was found to be filled with the spines of the Canada Porcupine, which was probably the cause of his diminished wariness and ferocity, and would in all probability have finally caused his death."[179]

The Cougar's Destructiveness

"Kill only what you can use" is a good sportsman's motto. Mostly, the Cougar lives up to it. But there are exceptions to this rule of high sporting ethics. One is when game is so plentiful that the Cougar, like some of our own species when by luck they have a repeating rifle and abundance of opportunity, cannot resist the temptation to kill a whole lot for the fun of seeing them tumbled under his prowess. The other is that of the female who has a vigorous and growing family, so does not take any chances, but goes a-hunting the very next day, having thus more than one meat cache on which to draw.

According to most hunters, a Cougar will commonly kill 2 Deer a week

[177] Donald D. McLean: Cal. F. & G., Jan., 1917, p. 39.

[178] Mamm. Ad., p. 30.

[179] Nat. Hist., N. Y., 1842, II, p. 49.

the year around, where game is plentiful. But I have known one kill that many a day among the winter bands of Deer in Yellowstone Park.

Steve Elkins says that a Cougar will average 2 Elk a week, and a female that he followed had killed 2 in one day.[180]

"It is a well-established fact," says H. C. Bryant, "that the Mountain Lion or Cougar is the most important enemy of Deer. Those who have studied the problem believe that a single Mountain Lion kills an average of 1 Deer a week throughout the year, thus making a total of at least 50 victims annually. A Lion often kills more than it is able to eat. There are records of one Lion having killed 3 Deer in a single night, and large Deer appear to fall prey about as often as small ones. W. T. Shock followed a male Lion for 3 days in Trinity County and found that it had killed 3 bucks during that time."[181]

It does not, however, limit its diet to venison.

Bachman's account of the Cougar's food reflects conditions chiefly in the South, where it preys on small animals, young Deer, Skunks, Raccoons, Wild Turkeys, Pigs, Calves, Colts, Steers that are mired; to this V. Bailey adds Gray-foxes and Mules;[182] and Enos Mills says that "The Lion eats almost anything. I have seen him catching Mice and grasshoppers. On one occasion I was lying behind a clump of willows upon a Beaver dam. Across the pond was an open grassy space. Out into this presently walked a Mountain Lion. For at least half an hour he amused or satisfied himself by chasing, capturing, and eating grasshoppers. He then lay down for a few minutes in the sunshine."[183]

In the northern Rockies there can be no doubt that the Cougar is the principal enemy of the Bighorn Sheep and Mountain Goats.

So much for the wild things on which it preys, and where man has replaced them with his own herds, the King of the Hills does not hesitate to accept the substitute.

In California, Dr. Saxton T. Pope says that he has known one old Cougar to kill 300 Angora Goats in a year, besides Deer.[184]

The scientific nickname of the Rocky Mountain Cougar is "Horse-thief," and from the Missouri to Monterey, from Vancouver to Val Verde, there is one long string of wails, enunciations, and lamentations over the Cougar as the remorseless, unremitting destroyer of Horses.

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[180] Field & Stream, Dec., 1918, p. 616.

[181] Cal. F. & G., Oct., 1917, p. 160.

[182] Texas, p. 162.

[183] Watched, p. 194.

[184] Field & Stream, Dec., 1919, p. 763.

In the Shasta country it was practically impossible to raise colts at all on account of the Cougars.[185] The same was true for a long time of the country near the Grand Canyon, Ariz.

He will pass by any other prey to get at his favourite food, the hot, fresh meat of a yearling colt, and loses no chance to show that his name of *hippolestes* or "horse-thief" is only too well bestowed.

"One Mountain Lion killed by a bureau hunter near Roosevelt, Ariz., had a record of destroying 50 calves and 3 colts on one ranch besides many killings on other ranches."[186]

Thus he challenges man to a final showdown, and at the same time lines up his friends among mankind; raising the question as to whether the wild King-cats of this fair land or the man-imported Cats and Dogs are more harmful.

"Dr. A. K. Fisher estimates that the Cats of New York State destroy 3,500,000 birds annually."[187] Also "the U. S. Government places the value of insect and weed-seed eating birds to the farmer at $1 each per year."[188] New York State conditions are repeated at least 20 times in the United States. This would imply an annual loss by Cats of $70,000,000 through destruction of bird life alone.

Dr. Frank M. Chapman is of the opinion that in 1902 there were 25,000,000 Cats in the United States, and maybe twice as many.[189] There are certainly twice as many to-day, and at the lowest reckoning, each Cat kills $1 worth of birds, besides other game each year.

Dogs are even more destructive, because they kill larger game and farm stock. Pennsylvania, with its population of 6,000,000, had, in 1921, 355,291 licensed Dogs. The unlicensed easily raise the number to 400,000, or 1 Dog to 15 inhabitants.[190] Greenwich, Conn., with its population of 22,300, has 1,300 licensed Dogs, and undoubtedly enough unlicensed to raise the number to 2,200, that is, 1 Dog to every 10 inhabitants. New Mexico, with its population of 500,000, had an officially estimated Dog population of 80,000, or about 1 to every 6 inhabitants. This high rate of Dog population is characteristic of the less densely settled regions, and it seems safe, with the figures in view, to estimate the Dog population of the United States at 10,000,000.

In the State of Missouri, with its human population of 3,000,000 and its

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[185] C. H. Townsend: Calif., 1887, p. 189.

[186] Ann. Rep. Biol Surv., 1920, p. 4.

[187] The Conservationist, July, 1919, foreматter.

[188] As above.

[189] Bird Lore, 1902, p. 70.

[190] Penn. Crop & Livestock Report, No. 70, April 1, 1922, p. 4.

estimated Dog population of 200,000, the Dog damage to stock alone in 1891 was $200,000,[191] added to which is the vast and unknown damage by destruction of game and harmless or beneficial wild animals.

Let us remember that the Sheep industry of the Eastern States has been virtually destroyed, not by Wolves or Panthers, but by Dogs.

The Deer of Connecticut, restored by carefully applied laws of conservation, have been reduced to almost nothing again, not by Wolves or Panthers, but by unrestrained poachers and Dogs.

So also throughout the West, the Dogs which vastly outnumber the Wolves, Coyotes, and Panthers, are the cause of enormous damage which is unfairly credited to the wild creatures. Thus, E. L. Pineau, of the U. S. Biological Survey in New Mexico, writes me: "Many Dogs supposed to be faithful family pets and watchdogs, prowl about at night unnoticed by their owners, and depredate on domestic animals and fowl. When the damage or loss is discovered, it is usually attributed to wild animals or other causes."

Unquestionably the annual damage done by Dogs in the United States is at least $200,000,000.

Contrasted with this, what is the entire Cougar damage in the United States? The Government hunters (Biological Survey) estimate the annual damage of a Cougar at $1,000.[192] There may be 5,000 Cougars in the United States to-day, certainly not more, making a total damage of $5,000,000.

According to mortality statistics furnished by the U. S. Bureau of the Census, the deaths from rabies (practically all conveyed by Dogs) ranged from 88 in 1911 to 54 in 1921, an average of 60 per annum. The decrease is due to the successful activity of the Pasteur Institute. The reports cover only 82.2 per cent. of the population by area, so that we must add about one quarter to the figures. That is, in the United States, Dogs are responsible for some 75 deaths each year among mankind through rabies alone. Deaths through physical assault or conveyance of tapeworm and other diseases are not tabulated, but are known to be numerous.

In North America, during 400 years, we have reliably recorded 6 cases of Cougars attacking mankind. In only 4 of them was human life lost. Undoubtedly, Dogs are guilty of as many unprovoked attacks on man every day, and destroy more human beings in a year than the Cougar during its whole written history.

These facts should be kept in mind when we attempt to solve the question of game preservation. Predatory wild animals are not the chief cause of the destruction.

[191] Sheep Industry in U. S., U. S. Dept. Agri., 1892, pp. 867–68.

[192] W. B. Bell, Yearbook, U. S. Dept. Agri., 1920, p. 29.

The Chase of the Cougar

On my desk before me now is a huge mass of printed matter gathered in thirty-odd years, dealing with Cougar hunts.

Most of these tell us how the hunter, "absolutely alone and without assistance of any kind, excepting that given by a pack of Cougar hounds and a very small army of experienced mountaineers, and armed with practically nothing but two or three high-power repeating rifles, had actually done to death a gigantic, ferocious, roaring, yelling Cougar that, according to the most conservative guesses, weighed when alive over 300 pounds and was estimated to be over 11 feet long."

Stories of this class are a regular output of the current magazines to-day. Before passing on, let me say that any one, man, woman, or child, who has a couple of thousand dollars to spare can do this very feat; that is, kill a Cougar, without the slightest risk, discomfort—or glory.

Because they are pleasant variants, and extremely rare, I shall give four hunting stories that I know or believe to be true.

The first, a hound hunt with a lasso finish.

The second, a hound hunt with a knife finish.

The third, a hound hunt with a bow-and-arrow finish.

The fourth, a single-hand fight by a lone hunter armed with a revolver.

The Lasso Finish

Buffalo Jones was a pioneer in the art of catching Cougars with the lasso. His adventures "Cougar-catching on the Siwash" have been recorded by Zane Grey, from whose thrilling account I quote.

The creature had been treed but decided to make another dash and fight for freedom.

"The Cougar grew more and more restless, spitting, growling, and swinging her tufted tail faster and faster. Jones got under her this time—close enough to make Frank and me call out warnings—and was re-coiling his lasso when the beast ran out on another branch and jumped. This time she fell short, clutched a dead piece that broke, letting her down hard into a bushy branch, from which she hung head downward. For a moment she swung free, then reached toward the tree, caught it with front paws and then back paws, ran down like a Squirrel, and leaped off when thirty feet from the ground. The action was as rapid as it was astonishing.

"Like a yellow rubber ball she bounded up, and fled with the yelping hounds at her heels. The chase was short. Moze nipped her again and again, and before she had gone a hundred yards she sought safety in another pine. Frank, who had mounted, in anticipation of just what happened, almost rode the Dogs down in his eagerness.

"This time the Cougar was well out upon a low, spreading branch. Jones conceived the idea of raising the loop of his lasso on a long pole, but the cunning beast pawed the rope aside. Then she leaped out over the Dogs and ran like a Deer down the ravine.

"For several hundred yards she outran the hounds, then they began to close upon her. Don, who was swiftest, nipped her tail and checked her. A blow on the side of the head sent him reeling. Sounder closed in, tried to hold the Cougar, but she eluded him, and dashing up the side of the ravine, leaped upon the first tree. It was a half-dead pine with short snags low down, and a big branch extending out over the ravine.

"'I think we can hold her in this tree,' said Jones, and he began the ascent of the trunk. As he went up, the Cougar started to move upon the snags, crawled up one after another, and seemed to be trying to get upon a big branch. It was plainly evident she was afraid of falling, but she succeeded, presently, in getting upon the large limb.

"Jones worked up to a position about even with her and then cast his lasso. It caught on a snag. Again and again he re-coiled and recast, only to fail.

"'Rope those dead twigs an' break them off,' yelled Frank.

"It was a good suggestion, which Jones at once carried out. At his next throw the lasso fell upon the Cougar. Angrily she shook it off. Again he sent the noose flying. She pulled it away from her back and bit it savagely. Jones jerked back so hard he nearly lost his balance. The noose caught on her front paw and slipped.

"'That's what I want,' called Jones; 'if I can get her front paw, she's ours. My idea is to pull her off the limb, let her hang there, and then lasso her hind legs.'

"He made at least twenty attempts, every one of which was futile. Finally a successful cast settled the noose perfectly round her neck. She chewed on the rope with her front teeth, and appeared to have difficulty in holding it. Cautiously Jones took up the slack, and slowly the rope tightened; the noose narrowed until a quick jerk fastened it close round her neck. We made the forest ring with our yells of triumph.

"That triumph was short-lived. Jones had hardly moved when the Cougar shot straight out into the air. The lasso caught on the branch,

hauling her up short, and there she hung in mid-air writhing, struggling, giving utterance to sounds terribly human. For several seconds she swung, slowly descending, while Jones bawled unintelligible commands to us. Then came a crash, and Jones fell out of the tree. The lasso was wrenched from his hands, and the Cougar dropped into the bunch of waiting, howling Dogs.

"For a moment it was impossible to distinguish what took place. A great flutter of leaves whirled round a swiftly changing mass of brown and black and yellow, from which came a fiendish clamour.

"I saw Jones plunge down the hill and try to grasp the whipping lasso. I lost my footing, stumbled, and fell prone on my face into the ravine, and rolled over and over until I brought up with a bump against a stone.

"What a tableau riveted my gaze. It rattled me so I never thought of my camera. The Cougar sat on her haunches with body well drawn back by the taut lasso to which Jones held wildly and grimly. Don was standing with her, upheld by her hooked claws in his head. The Cougar had her paws outstretched; her mouth was wide, showing great white fangs; she was trying to pull the head of the dog to her. The other hounds were tussling round her body. Suddenly both ears of the dog pulled out, slit into ribbons. Don had never uttered a sound, and once free, he made at her again with open jaws. One blow sent him stunned and bleeding. Then began again that terrible wrestling whirl.

"Frank and I seized clubs and ran in upon the confused furry mass. We fought all over the bottom of the ravine, crashing through the bushes, over logs and stones. At last we pulled Sounder and Moze to where Don lay half stunned and I held them while Frank turned to help Jones.

"The panting Cougar crouched low on the ground with eyes of purple fire.

"'For God's sake get a half-hitch on that sapling!' called the cowboy.

"His quick grasp of the situation averted a tragedy. As the Cougar sprang, Jones threw his lasso round the sapling. The Cougar missed him, although her left front paw stretched alarmingly near his face. She came to the ground with a heavy thud. A flash of Jones's big hands fastened the lasso, and Kitty was a prisoner. While she fought, rolled, twisted, bounded, writhed with hissing fury, Jones sat mopping his face. Her efforts were futile; she began to weaken from choking.

"Another lasso stretched her out helpless between two saplings; and then the old buffalo-hunter calmly took her paws in his powerful grip and clipped off her dangerous claws. Forcing her mouth open with a stick and pressing her head back on the ground, he strapped a collar round her neck and snapped a chain to that. Then, unaided, he muzzled her with a wire

round her jaws, held in place by a little bar of iron thrust back of her big canines—and Kitty was a subject of pity.

"That night she crouched close beside a pine-tree not fifty feet from our camp-fire and worked ceaselessly for that thing which, to man and beast alike, makes life worth living—freedom."[193]

The Knife Finish

The next is a condensed account of one of Roosevelt's hunts in Colorado, 1901, by himself. The hounds had driven a female Cougar to bay in her den, had killed her cubs, and driven her out the back way.

"Away she went completely through the low cave or hole, leaped out of the other end, which was some 30 or 40 yards off, scaled the bank, and galloped into the woods, the pack getting after her at once. She did not run more than a couple of hundred yards, and as we tore up on our Horses we saw her standing in the lower branches of a pinyon only 6 or 8 feet from the ground. She was not snarling or grinning, and looked at us as quietly as if nothing had happened. As we leaped out of the saddles she jumped down from the tree and ran off through the packs. They were after her at once, however, and a few yards farther on she started up another tree. Either Tony or Baldy grabbed her by the tip of the tail, she lost her footing for a moment, and the whole pack seized her. She was a powerful female of about the average size, being half as heavy again as the one we first got, and made a tremendous fight; and savage enough she looked, her ears tight back against her head, her yellow eyes flashing, and her great teeth showing as she grinned. For a moment the Dogs had her down, but biting and striking she freed her head and forequarters from the fighters, and faced us as we ran up, the hounds still having her from behind. This was another chance for the knife, and I cheered on the fighters. Again they seized her by the head, but though absolutely staunch Dogs, their teeth, as I have said, had begun to suffer, and they were no longer always able to make their holds good. Just as I was about to strike her she knocked Turk loose with a blow, bit Baldy, and then, her head being free, turned upon me. Fortunately, Tony caught her free paw on that side, while I jammed the gun-butt into her jaws with my left hand, and struck home with the right, the knife going straight to the heart. The deep fang marks she left in the stock, biting the corner of the shoulder clean off, gave an idea of the power of her jaws. If it had been the very big male Cougar which I afterward killed, the stock would doubtless have been bitten completely in two.

"The Dogs were pretty well damaged, and all retired and lay down

[193] Everybody's Mag., June, 1908, pp. 784–85.

under the trees, where they licked their wounds and went to sleep; growling savagely at one another when they waked, but greeting us with demonstrative affection, and trotting eagerly out to share our lunch as soon as we began to eat it. Unaided, they would ultimately have killed the Cougar, but the chance of one or two of them being killed or crippled was too great for us to allow this to be done; and in the mix-up of the struggle it was not possible to end it with the rifle. The writhing, yelling tangle offered too shifting a mark; one would have been as apt to hit a Dog as the Cougar. Goff told me that the pack had often killed Cougars unassisted; but in the performance of such feats the best Dogs were frequently killed, and this was not a risk to be taken lightly."[194]

The Bow-and-Arrow Finish

To Dr. Saxton T. Pope of California, with his partner Arthur Young, belongs the glory of reviving and demonstrating the heroic old sport of killing big game with bow and arrows.

They had killed all kinds of game from Ground-squirrels to Deer and Bear, and were anxious to try their weapons on Cougar. So they set out in September for a Cougar hunt, with the help of a small pack of three Dogs, in the wilds of Tuolumne County, Calif.

"Up at an elevation of 5 or 6 thousand feet, some 20 or 30 miles above Sonora, on Rose Creek, we came across the tracks of a good-sized Lion.

. . . . . .

"On the first day his tracks were so cold that the Dogs were not able to follow them, but they showed us the general route of our friend *Felis*. Next morning bright and early we arrived on the mountain crest in time to strike a fresh scent. The Dogs worked around in circles for a few minutes unwinding the trail. We later learned that our Lion had been fussing with a Porcupine at this spot. When old Eli struck the outgoing trail, you saw nothing but a streak of yellow disappearing over the ridge. Eli is that rare combination of shepherd and Airedale that makes the best Lion Dog. Although he is a silent trailer, he has a record of 52 Lions to his credit. Ranger, the hound, is slow but sure, and when he gets on a hot track the neighbours know it. Dick is a crazy Airedale that will fight anything after a good Dog finds it.

"Eli, Ranger, and Dick all beat it, in a straight line, and so did we. This is no place for a Horse. It is a question of legs. If the automobile has not absolutely ruined your powers of locomotion, you may stand a show, but you've got to prove it.

[194] Scribner's. Nov., 1901, p. 548.

"I want you to know that we are running up the side of a mountain, over the crest, through manzanita brush, thickets of young cedar, buck-thorn, over ledges of lava, down steep declivities, through mountain misery among giant oaks, cedars, and pines.

"We are stripped for action. Young and I both carry powerful yew bows, 5 feet 8 inches long, pulling 75 pounds. At our sides swing deerskin quivers, holding a dozen or more steel-tipped arrows, sharp as daggers. Besides hunting knives we have no other weapon. We run and gulp and thump till every muscle is about to strike, when we arrive at a large oak on the mountain side, and there are the Dogs dancing beneath it.

"Up on a limb of the tree sits one of the most beautiful animals I ever saw. His colour is exactly that of a Deer, blue-buff. There he sits very quietly swinging a great undulating tail. We take a big breath and are ready for business. Old Felis is all hunched up, covering his vital areas very cleverly. We are about 20 yards from him, and stand in the only spot that permits direct fire. There is an opening about 4 inches across his chest where we may shoot.

"I count three, and at the word Young and I let fly our arrows in unison. They fly wild; mine buries itself deeply in his shoulder; Young's strikes below his eye and enters his throat. The Lion rears and battles with this arrow. As he sways in the tree, thrashing from side to side, we shoot again, and miss him clean. You can go up there in Tuolumne County and find one of my perfectly good arrows sunk deep in the heart of an oak.

"Just then he freed himself from the offending shaft, and as he did so he poised to leap. In that movement he exposed the white line of his chest. We steadied our arms, drew to the head and loosed two whizzing shafts. They struck him full and fair over the heart, not 3 inches apart. So clean and hard they struck that on they flew; feathers and all slipped through his chest. Man! man! that was a dandy shot!

"At that instant out he leaped and soared over our heads like a Flying-squirrel. With one mighty bound, he swept an arc of 75 feet, downhill, and landed running. But he did not run far. He fell, he staggered to his feet, the Dogs were on him, he struggled, fought wildly, gurgled, and died."[195]

The Single-handed Finish

From the many hundreds, maybe thousands of hunting stories, I select the following because of its two crowning virtues: It is different from all the others, and it came near being a fair match of man's power and wits against

[195] Field & Stream, Dec., 1919, p. 763.

beast power and wits, for the hunter did not have the help even of a yellow pup.

The story is told by P. H. Moore, a young man who in the early winter of 1899 was hunting alone in Brown's Park, northeastern Utah. He had killed a Deer and made a midday camp.

"While toasting my feet and munching my lunch," he says, "my eye wandered aimlessly along the top edge of one side of the canyon, and espied a Cougar loping along against the skyline. I could not tell whether it had seen me or not. What wind there was, was drawing straight down the canyon, and I felt sure that he had not got my scent. The Cougar, in the meantime, scrambled down over the edge of the cliffs and disappeared in a crevice in the rocks.

. . . . . .

"My actions after seeing that Cougar were not governed by reasoning or common sense. I just naturally followed some primal instinct and went after that Cat. Leaving my coat, lunch, and venison beside the embers of the fire, guarded only by a couple of empty shells, following the tradition that the smell of burnt powder will keep away Coyotes, I started up the side of those cliffs, with the Cougar's lair as my objective. Coming to the mouth of the crevice which, a mere seam in the rocks ten feet above my head, opened to nearly twice the width of a man's body at the base, I stopped and fired a shot from my forty-five into the gloom. I jumped back and waited, but nothing happened. I tried it again with the same result.

"Being impatient to start something, I laid my rifle on the ground, loaded the empty chambers of my six-gun, and with it in one hand and my hunting knife in the other, crawled into that black, spooky-looking hole after that Cat.

"I wouldn't do it to-day for a million dollars. I crawled along some 10 or 12 feet, the hole getting narrower and my head-room less as I dragged myself forward. When the bulk of my body had shut off the light behind me, I stopped and listened. Somewhere ahead in the darkness I heard the Cat growling. I hunched forward a few more feet and then got sight of its two blazing eyes. No hunter needs to be told what a wild animal's eyes look like in a dark place. If my hair had been 3 feet long it would have stood straight on end. I unlimbered the old forty-five, and the report deafened and must have scared the Cat. It let out a nerve-racking snarl, there was a scrambling and rolling of stones, a puff of dust, and then absolute stillness. I could hear my heart beating. In fact, it made a noise like a riveting hammer on a piece of boiler plate. I waited with my six-shooter cocked for something to happen. Finally after quite a struggle I lit a match.

There was no Cougar in sight. I found that my head and shoulders were sticking out into an irregularly shaped rocky chamber, perhaps 15 feet long and 6 or 7 feet wide and high enough to stand up in. I crawled in and lighting various matches began to explore. The crevice in the rock making this little cavern narrowed down at the far end, turned to the left, and went almost straight up like a chimney. Peering up this hole with my light extinguished, I could see a faint gleam of daylight. As it seemed to be big enough for the purpose, I proceeded to climb. I found it difficult to worm my way up this hole with a cocked six-shooter in my right hand. When I had negotiated some 7 or 8 feet of this chimney it widened, took a little more horizontal angle, and came to the light of day under the edge of a big sandstone boulder some 30 feet above where I had entered. I stuck my head out and looked around, winded and scratched, but keenly alive to eventualities. Then I crawled out, stood up, and looked for tracks. There was a little wind drift of powdered snow along the edge of the mesa that I was now standing upon, and I soon found what I was looking for. The Cougar's tracks were there, but there was no blood. He had evidently loped down along the edge of the cliff in the direction from which he had first come when I saw him while I was at lunch. As there was no foliage and the edge of the mesa was practically without cover, and the Cougar was not in sight, I concluded he must have gone down over the edge of the cliff to hide in among the rocks in its rough face. Keeping well back from the edge I followed his tracks, now and then discernible between the bare spots, for perhaps 200 yards, and then lost them. I crawled on my stomach to the edge of the cliff and looked over. There was no game in sight. Crawling carefully back I followed the edge of the mesa perhaps another 100 yards, and this time was rewarded by a sight of the Lion lying at full length on a little ledge of rock some 25 or 30 yards below me, and perhaps 50 yards to the left. Cautiously taking the back track I estimated the right spot to again peer over the cliff and get a shot. As I had nothing but my forty-five to kill him with, I did not wish to take any chances of losing out. The next time I peered over the cliff the Cat was not over 40 yards from my position.

"Even while carefully aiming my six-shooter at the back of his head I could not but note the sly curiosity with which he was watching the entrance to the cave where both he and I had first gone in. Although I could not see it, it must have been in plain sight from where he was lying flattened out on the ledge like a Squirrel on the limb of a tree. I even noted the tip of his tawny tail as it snakily waved slowly back and forth.

"I fired.

"With the click of the hammer the Cougar sprang out into the air,

struck some jagged boulders 40 or 50 feet below, tumbled and rolled a few yards farther down, and then lay still and crumpled among the sandstone boulders.

"When I scrambled down to him he was stone dead, the bullet having struck the back of his head between his ears and penetrated his brain.

"Outside of feeling weak in the knees and shaking like a leaf, I was not very much excited.

"It took me all the afternoon to get that Cat skinned and the hide tied up for carrying. It was dark by the time I got my rifle and had the skin back to the camp fire. It was half-past ten at night before I got back to the bunk house with my load."[196]

[196] Field & Stream, Sept., 1919, pp. 473–74.

Does the Cougar Ever Attack Mankind?

When first the Cougar became known to white men, they reasoned, as Shoemaker says, "that an animal which howled so hideously at night must be a destroyer of human life."[197]

Equipped with this idea, with the love of the terrible, and with a few though rare cases of Cougar ferocity, the early historian pictured a very demon of the woods, an insatiable man-eater, that lured brave men to destruction by simulating the cry of a woman or child in distress, then sprang on the would-be rescuer as a Cat does on a Mouse, and bore him away to be devoured at the top of some tall tree.

The epoch of these lurid and over-abundant demon tales was followed by one of utter skepticism, from about 1850 to 1900, during which men said that no Cougar ever was known to attack man, woman, or child.

For example: "The Panther is one of the most cowardly of beasts, never attacking man unless wounded and cornered."[198]

"I have never known a single instance where a Panther has attacked a human being."[199]

"We do not recollect a single well-authenticated instance where any hunter's life fell a sacrifice in a Cougar hunt."[200]

"There are many people who think the Panther a dangerous animal, but I never saw anything to make me think it was."[201]

In twenty-odd years of experience J. C. Hughes of New Westminster, B. C., knew of but one Cougar attacking a man and that apparently was by mistake, for the beast ran off when the man shouted.[202]

Cougar Attacks

A number of cases have been recorded where Cougars attacked man through mistake, and others when the creature really attacked a Horse before it noticed in the gloom that a man was riding it.

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[197] Penn. Lion, p. 13.

[198] Mamm. Ad., p. 36.

[199] Fannin, Forest & Stream, March 6, 1897, p. 184.

[200] Q. N. A., II, p. 311.

[201] Hugh Johnson, Forest & Stream, Oct. 5, 1907, p. 532.

[202] Forest & Stream, Sept. 6, 1883, p. 103.

PLATE XVII.—MY FIRST MEETING WITH A COUGAR, 1899
By Ernest Thompson Seton, 1904

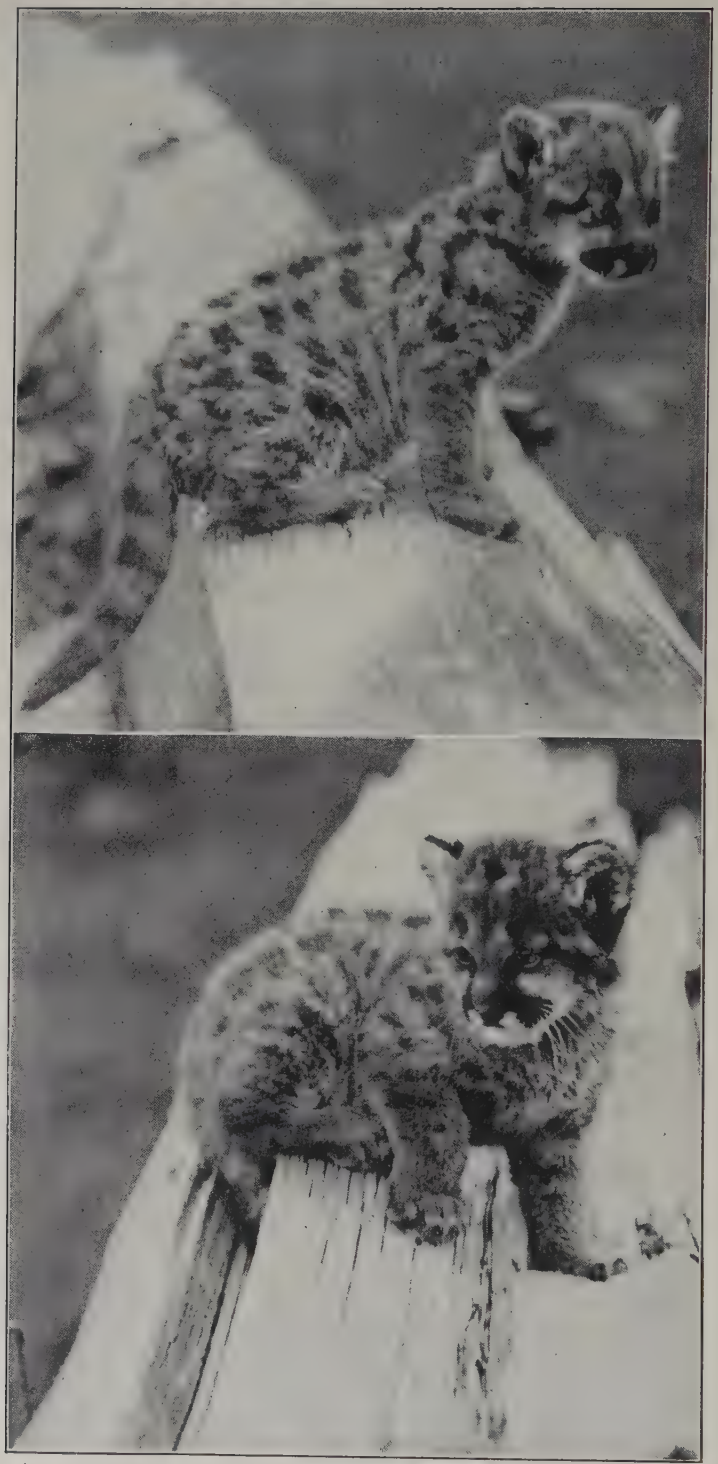

PLATE XVI.—YOUNG COUGARS
From photographs by Wm. L. Finley

Hugh Johnson gives a case in point: "This man that I speak about that was jumped on by a Panther was travelling along a trail between Cook City, in Montana, and the Yellowstone, and a Panther jumped on him from a rock above, caught him by the shoulder and threw him down. The man yelled and the Panther let him go and ran off. I have always believed that the Panther just took him for a Deer, and when he found out that it was a man, was just as badly scared as the man was, and made tracks."[203]

These last quotations represent the epoch of utter skepticism, but now we have enough evidence to show that on rare occasions the Cougar does attack mankind.

Roosevelt gives, and evidently believes, several detailed accounts of Pumas attacking man in Patagonia and adds: "As far as I know they are the first trustworthy accounts of a Cougar's having attacked man under normal circumstances."[204]

James Fullerton, who lived among the Cougars for over 40 years, gives the following. In the first case at least the Cougars were amply justified in their attack.

"Out in northern Idaho, in 1884, a section hand, wandering in the woods one Sunday, saw two Lion cubs asleep behind a log. They were about 3 months old and husky youngsters. The man was unarmed save for a sheath knife and never gave a thought to the fact that the cubs had a mother, but sneaked up and fell on them. They put up a lively scrap and a great call for help, as he started back to the house with them. Their calls were heard and answered, not by one but by two Lions, a male and a female. Whether the male takes a fatherly interest in his family and assists with their education or just happened to be there on a courting visit, I have never been able to learn, but he took a hand in the fight. The man killed both with his knife, but was almost disembowelled, his chest and back were torn, his left arm chewed and broken, and his face fearfully lacerated. A doctor came from Spokane, sewed him up, and his first question on recovering consciousness was, 'Where are my cubs?' He learned they were safe in a cage and his Lion skins stretched, awaiting his recovery.

"I heard of a woman in western Colorado having a baby taken from a cradle but if I remember aright she either shot or scared the Cougar so that the child was recovered little the worse. These are the only two authentic cases I have met with in 40 years."[205]

One of the oldest records in the country, that seems to be true, and that

[203] Forest & Stream, Oct. 5, 1907, p. 532.

[204] Through the Brazilian Wilderness, 1914, pp. 28, 29, 30, 31.

[205] Sports Afield, Sept., 1913, p. 215.

PLATE XV—PEN SKETCHES OF COUGARS

By E. T. Seton

has passed the censor so far, is given by McMurtrie in Cuvier's "Animal Kingdom," I, 1831, p. 115, as follows: "That this animal, our common Panther, does not always confine closely to Sheep, etc., is well known, and has lately been proved, Jan., 1830, by an unprovoked attack upon an unfortunate woman in Pennsylvania. The ferocious brute seized upon her as she was passing along the road, and killed her in an instant."[206]

The next case chronologically is the one related by "Grizzly Adams," as he is best known. In the spring of 1854 he was on a hunting trip into Nevada with a friend, when they had an encounter with a Cougar that showed a ferocity worthy of a man-eating Tiger.

"On another occasion," he says, "Solon and I started out very early; and, coming to a spot where two ravines came together, he started up one and I the other. I had not gone more than a quarter of a mile before I heard Solon cry out for help. I bounded up the ridge which separated us, and, upon reaching the top, saw him lying under a large tree in the other ravine, and a Panther on top of him, apparently gnawing into his neck. I shouted to him to lie still, and drawing my rifle, fired at the beast; but, in my anxiety to shoot wide of my comrade, I did not strike the Panther fair, and he bounded off into the bushes and escaped.

"In answer to my inquiries in relation to this singular adventure, Solon told me that as he was walking up the ravine, looking forward, and paying no attention to the trees overhead, the beast suddenly leaped upon his back and struck him to the ground. In the same moment that he fell, he cried out for me, and pulled the cape of his buckskin coat over his neck—and this evidently saved his life."[207]

The next case is from British Columbia, and took place Oct. 1, 1898, near Agassiz within 35 miles of Vancouver. The story is told by P. Nelson, who mentions that the Cougar skin was over $7\frac{1}{2}$ feet from "tip to tip."

"With my partner, J. Hanley, and two other men," he says, "I have been developing a mining property recently between Harrison and Agassiz, about 35 miles from Vancouver. I came down last week, leaving the men working as usual. Last Friday it was rainy, and Hanley, according to the letter and other information I have received, laid off for the day and went shooting grouse. He had an old double-barrelled gun with one of the hammers knocked off, so in reality it was but a poor kind of single-barrelled fire-piece. As I said, he was going to shoot grouse, and he only had cartridges loaded with fine shot. Half an hour after he left camp the Dog—you

[206] The Puma, 1891, p. 602.

[207] Adv. J. C. Adams, pp. 207–08.

should say a good word for him, though I suppose he does not read *Outdoor Life*—treed a Mountain Lion. Then the fun began.

"I've shot a good deal in British Columbia, and I would not have taken the risk for an instant, but Hanley ran up to the tree and with his one load of shot in the gun fired at the Cougar right in the face as the animal looked down preparing to spring. And the spring came next, but the animal had one eye out. It was on an incline and that is what probably saved Hanley's life. The Lion jumped full at his face, and both his claws inflicted wounds on Hanley's shoulders that he will bear to the end of his days. In the momentary struggle that followed, Hanley's face was scratched up, the clothing nearly torn from the upper part of his body, and his breast lacerated as if it had been cut by razors.

"But Hanley had a Dog with him. He is a good chunk of a bull-terrier weighing perhaps 75 or 80 pounds, and the instant that the Lion touched the ground and as quickly knocked over the almost defenseless man, the Dog fastened his teeth into the throat of its adversary of the forest and clung there. Dog and Cougar rolled over and over again in the leaves under the trees until the man gathered himself together with his fast-failing strength and opened fire again—not from the barrel of the weapon, but with the stock he belaboured the Lion over the head until life was extinct and incidentally the gun smashed to pieces. I don't suppose I would have heard of this only my partner wanted a new gun and he sent to me for it.

"Well, the two—the Dog and the man—gathered their scraps together, though both were in a bad plight. At first Hanley thought the Dog was done for, as he had to unloose the jaws that held so tightly on to the throat of the larger adversary. After resting awhile, Hanley carried the Dog to the road, about a mile away, and from there both were helped home by passers-by. The body of the Cougar was obtained later on. According to the letter my partner would be able probably to be out again after a day or two's rest, but you can say for him that I don't think he will go Cougar hunting with a single-barrelled blunderbuss and grouse shot for some little time to come."[208]

The next case, and this is fully authenticated by many witnesses, took place in California not far from Morgan Hill at a place called Glen Willis on Coyote Creek, July 6, 1909.

Miss Isola Kennedy, daughter of John Kennedy of Morgan Hill, had gone for a drive taking with her Henry Merkle of Fruitvale, and Curtis Lane of Morgan Hill, lads aged 10 and 8 years respectively. They were joined by another boy, Earl Wilson.

[208] Outdoor Life, Dec., 1898, p. 82.

"She drove some 700 or 800 yards above the bridge near Glen Willis, and leaving the rig, took a seat upon the bank of the creek while the youngsters waded in the creek a little distance away. She was suddenly horrified to see an immense California Lion jump from the bank and alight upon the back of the [Wilson] boy. The boy fell into the shallow water and the Lion at once left him and ferociously attacked Miss Kennedy, who fought him as best she could with her only weapon, a large hatpin.

"The Lion first seized his intended victim by the leg and dragged her down, then tried to get at her throat. She struggled to her feet and clasped her arms across her face, holding them in spite of the beast's attempts to claw them away. The boys lost no time in running to the camp of the Bay Cities Water Company and giving the alarm. Their appeal was answered by John Conlan and Mr. Fletcher, employees of the Water Company. Mr. Conlan had armed himself with a shotgun, and with this he fired 4 shots at the ferocious beast. The animal did not seem to notice the shots and never for an instant ceased its onslaught on Miss Kennedy.

"In the meantime, Mr. Fletcher, realizing the ineffectiveness of the shotgun, had gone for a rifle, which he handed to Mr. Conlan.

"After receiving the rifle Mr. Conlan says it seemed to him fully 5 minutes before he could get an opening to shoot without danger of killing the young woman, so close was the Lion's assault. The opening finally came, however, but 3 bullets were necessary before the animal ceased to struggle, and almost with its dying gasp it was still clawing at the prostrate girl.

"The struggle between the Lion and the girl lasted fully 15 minutes, and that she survived at all is marvellous. An express wagon was secured, in which she was placed upon a mattress and conveyed to her home in Morgan Hill, about $2\frac{1}{2}$ miles distant.

"She was there treated by Dr. J. T. Higgins, who found that, while she was badly lacerated and scratched on many parts of her body, her left arm and shoulder had suffered most, the arm especially being literally mangled. . . . Miss Kennedy's face will not be disfigured except that the left ear is entirely gone.

"Earl Wilson sustained a severely lacerated neck where the animal's claws had struck, and one ear was split wide open. The boy's wounds are not considered grave.

"The Lion [a female] measured 8 feet from tip to tip and weighed 150 pounds."[209]

The boy was taken with tetanus and died. Miss Kennedy lingered till September, then died of hydrophobia, as is testified by Dr. J. T. Higgins

[209] Outdoor Life, Dec., 1909, p. 599.

of Watsonville, Cal., and fully set forth in *Cal. Fish & Game* for April, 1923, pp. 45–48, "Rabies in a Mountain Lion," by Tracy I. Storer, who points out that prior to that date "there was for California, so far as the writer is aware, only one recorded instance in which a Mountain Lion has, without obvious provocation, attacked a human being. This occurred in Quartz Valley, Siskiyou County, on June 19, 1890, when a seven-year-old boy was set upon and killed by two Lions while he was playing among the foothill oaks at some distance from his home."[210]

The latest case, attested beyond a shadow of doubt, ended, fortunately, not in a tragedy. It took place in Vancouver Island, Sept. 23, 1916. Very full accounts of the affair appeared in all the sporting papers, but that given in the New York *Herald* for Wednesday, Aug. 15, 1917, seems simplest and yet complete.

"An unusual feat of bravery was brought to light to-day by the official report from the office of the Department of the Secretary of State of Canada announcing the confirmation of an award of the Albert Medal of the second class to Doreen Ashburnham, 11 years old, granddaughter of Lord Ashburnham of Sussex, England, and to Anthony Farrer, 8 years old, both of Cowichan Lake, Vancouver Island, B. C.

"The report states that the children left their homes together with bridles, intent on catching their saddle ponies, pastured in a meadow about half a mile from a dwelling at Cowichan Lake. The distance had been almost traversed when they encountered a large Panther which sprang upon the little girl, bearing her to the ground, face downward. Her companion called to her to remain perfectly quiet and leaped upon the Panther's back, overbalancing the beast and permitting Doreen to regain her feet.

"The animal with one of its paws struck the boy full in the face, knocking him down. It then sprang upon him mauling and clawing his back and head, but he called to the girl to run. Although terrified, she refused to leave and began beating the Panther with the steel bit of the bridle over the face and eyes. But unable to see the beast tearing her companion's flesh she deliberately thrust her right arm into the creature's mouth, which sank its teeth into the flesh of her forearm. With her other free arm she continued to beat the Panther until it was blinded and slunk away.

"Both the children were in a critical condition. Anthony had a severe scalp wound.

"A homesteader [named Charles March], with a pack of Dogs killed the Panther. The animal was starving and almost blind. It was 7 feet 9 inches long," yet weighed only 75 pounds.

[210] Outdoor Life, Denver, Colo., Aug., 1915, pp. 162–63.

When in Venezuela, Feb., 1920, Dr. W. H. Osgood of the Field Museum had an adventure which convinced him that some Cougars at least are ready to attack man. He was collecting birds, etc., in the virgin wilderness 80 miles southwest of Maracaibo, and relates:

"At a turn in the trail and on the crest of a wooded knoll, when I was halfway to camp, feeling the heat of the powerful sun, passing a spot previously reconnoitred carefully for Deer, and hence not so alert as before, I was suddenly confronted by what to my astonished eyes seemed the largest Cougar that ever grew. It started from behind some low bushes at my left and 50 feet, or at most 60 feet, in front of me. I did not see it rise, but it gave the impression of having been lying down. The forest was rather scraggly at this point and the trail I was following was dissolved in several small openings, in one of which the animal appeared, so the sensation of meeting it directly in the trail was lost. It started toward me immediately, growling savagely, its eyes blazing, tail lashing, and if there was any indication that it did not intend to make away with me, I failed to recognize it. It did not come on the run, however, and whether it would have done so or not I cannot say, for its long feline strides were so full of determination I did not care to await developments, but promptly fired a load of buckshot full into its face. It dropped instantly and rolled behind some small bushes which prevented me from firing the second barrel. I had a flash of elation, but the glowering visage was still uppermost in my mind; so, instead of running in with my other barrel, I prudently stopped to reload the one already fired and while the gun was open the Cougar rose, and disappeared in a dense thicket, leaving scattered drops of blood and a trail which I could not follow far without Dogs. Failure to kill the beast of course caused considerable chagrin, but the unique experience was some consolation.[211]

In each of these North American cases, except four, there seems to have been some extraordinary or explanatory circumstances.

In the first, given by Hugh Johnson, the man was mistaken for a Deer.

In the second, the Cougars were defending their cubs.

In the third, the Cougar was not very serious if the woman took the baby safely from it.

In the Pennsylvania case, it seems to have been unrestrained ferocity.

Also in the Grizzly Adams's case.

In the Hanley case the Cougar was at bay and wounded.

In the case of Miss Kennedy the victim died, of rabies.

In the Quartz Valley case, there is nothing to be said in defence of the Cougars. Details, however, are lacking.

[211] Journ. Mamm., Nov., 1920, p. 240.

And in the last, that of the Vancouver children, we are told that the Cougar was very old, blind, and starving.

In considering these cases we are struck by the lack of energy in the attack. An ordinary Cougar can instantly kill a 200-pound Deer, can quickly overcome an Elk, or even a Horse; while a blow of its paw or a craunch of its jaw will put the biggest Dog out of the fight. How, then, could a young woman with a hatpin fight off a vigorous 150-pound Cougar, if he were really trying to kill her? How could two small children, practically unarmed, drive off even a decrepit old Cougar? These are among the puzzles.

Finally, even admitting that 6 of the cases were deliberate and ferocious attacks on human life, we must remember that we have been hounding, hunting, and killing at least 500 Cougars a year in North America, for the last 100 years, and yet we have recorded in that time only 6 attempts on human life by Cougars and but 4 of them successful.

This, then, is a fair summing up of the case: The Cougar is a shy creature, avoiding man and perfectly harmless to him under all normal circumstances. But morbid, diseased, or cranky individuals appear from time to time, as in every species, and these may, under some circumstances, attack and even kill mankind.

Nevertheless, the utterly puzzling circumstances already noted *seem* also to justify the further conclusions:

That under no normal circumstances will a Cougar declare war on man personally, and under no circumstances, normal or otherwise, will it turn on him the full measure of power and ferocity that it holds in reserve for such other fellow brutes as may cross its will.

Curiosity and Friendliness

Having thus disposed of almost all the testimony charging the Cougar with demoniac ferocity and perpetual thirst for human gore, we are confronted by a mass of evidence that indicates a totally different disposition in this wild freebooter of the mountains.

The exploding of the man-eating idea about it had this good effect: men being no longer paralyzed by terror, began to observe, when they met the Cougar. The results were intensely interesting. Among other things, they found that the Cougar—some Cougars, at least—are possessed of a curiosity that is said to be the trail to knowledge; and, further, the animal is naturally disposed to consider man as a friend rather than as a foodstuff.

Enos A. Mills says: "The Lion has extreme curiosity. He will follow travellers for hours if there is opportunity to keep out of sight while doing so. Often during long snowshoe trips I have returned over the

route first travelled. Lion tracks in the snow showed that I was repeatedly followed for miles. In a number of places, where I had taken a long rest, the Lion had crept up close, so that he could easily watch me; and on a few occasions he must have been within a few feet of me."[212]

Says W. H. Hudson: "I have known only one Puma kept as a pet, and this animal, in 7 or 8 years, had never shown a trace of ill-temper."[213]

He amplifies this picture of animal good-humour with a chapter on the positive benevolences of the Puma in his feeling for man—the "Friend of the Christians," as the natives call it.

The incidents that he cites are amazing. They show that the Cougar not only never attacks man, but is naturally disposed to show him friendship, and is ready to act as his friend and protector even to the extent of risking its own life, to save him from such a fierce, strong beast as the Jaguar.

We may be disposed to question the full measure of the surprising conclusions that Hudson arrives at, but he is a good naturalist and his observations cannot be dismissed as entirely baseless.

Professor Romanes, reviewing Hudson's book in the *Nineteenth Century*, May, 1893, quotes the account of the Puma's habits and character given, then says: "I have received corroboration touching all these points from a gentleman who, when walking alone and unarmed on the skirts of a forest, was greatly alarmed by a large Puma coming out to meet him. Deeming it best not to stand, he advanced to meet the animal, which thereupon began to gambol around his feet and rub against his legs, after the manner of an affectionate Cat. At first he thought these movements must have been preliminary to some peculiar mode of attack, and therefore he did not respond, but walked quietly on, until the Puma suddenly desisted and re-entered the forest. This gentleman says that, until the publication of Mr. Hudson's book, he had always remained under the impression that that particular Puma must have been insane."

In the Coyote "Life" are given details of a pleasant friendship between a Cougar and a Coyote.

Hugh Johnson, after a lifetime among the Cougars of Montana, says: "A number of times I have been followed by Panthers and I have heard of other men that had the same experience, but none of those men were ever attacked by the animals.

. . . . . .

"I knew of a case over in Oregon, a number of years ago, when two little children, a boy and a girl, were followed through the woods for a mile

[212] Watched, p. 199.

[213] Nat. La Plata, pp. 40–41.

or two by a Panther. They were going from a neighbour's house to their home. The Panther came out of the woods and trotted along behind them and beside them, and they thought it was a Dog and tried to make friends with it. It never did anything but just keep along with them, and when they got to the little fence around their own house, it went off into the woods. The mother saw it as it was going away, and was terribly scared, but the children did not mind it."[214]

H. W. Shoemaker tells of a Pennsylvania Panther, which followed a small boy to school every morning for a week.[215] He also writes me as already noted: "They often looked in the windows of mountain cabins, in Pennsylvania. One surprised the Askey family of Cold Spring, Center County, Pa., in the winter of 1922."

J. Fannin tells of two children going to school near Victoria, B. C., "when a Panther sprang out in front of them and trotted on ahead."[216]

Chas. F. Lummis, during his famous walk from Maine to Peru some 30 years ago, had a similar friendly visit from a Cougar as he tramped through Mexico, but I must wait until he publishes the details in his own words.

The following, by Roosevelt, illustrates, I think, nothing but the mild curiosity of the animal. The incident was the experience of the Mathes Brothers of Meeker, Colo.

"The three men, with one of their two cattle Dogs, were walking up the valley not half a mile above the ranch house, when they saw a Cougar crossing in front of them, a couple of hundred yards off. As soon as she saw them she crouched flat down with her head toward them, remaining motionless. Two, with the Dog, stayed where they were, while the other ran back to the ranch house for a rifle and for the other Dog. No sooner had he gone than the Cougar began deliberately to crawl toward the men who were left. She came on slowly but steadily, crouched almost flat to the ground. The two unarmed men were by no means pleased with her approach. They waved their hands and jumped about and shouted; but she kept approaching, although slowly, and was well within a hundred yards when the other brother arrived, out of breath, accompanied by the other Dog At sight of him she jumped up, ran off a couple of hundred yards, went up a tree, and was killed. I do not suppose she would have attacked the men; but as there was an unpleasant possibility that she might, they both felt distinctly more comfortable when their brother rejoined them with the rifle."[217]

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[214] Forest & Stream, Oct. 5, 1907, p. 532.

[215] Penn. Lion, pp. 23–24.

[216] Forest & Stream, March 6, 1897, p. 184

[217] Scribner's, Nov., 1901, p. 557.

Many more cases might be cited that show the same disposition in the Cougar, and the new estimate of the creature was quite accepted by the naturalists. But they were not quite prepared for the next contribution.

Playfulness

"The most playful animal on earth; even when full-grown it still has the heart of a kitten." This is the verdict of many good naturalists, and in corroboration I give some pointed extracts. The first from the well-known naturalist, Enos A. Mills, who writes in his account of a ski-trip over the Continental Divide, Colorado:

"Southward I travelled along the nearly level expanse of undrifted snow. Looking back along the line of my ski tracks, I saw a Mountain Lion leisurely cross from east to west. Apparently she had come up out of the woods for mad play and slaughter among the unfortunate snowbound folk of the summit. She stopped at my tracks for an interested look, turned her head, and glanced back along the way I had come. Then her eyes appeared to follow my tracks to the boulder pile from behind which I was then looking.

"Playfully bouncing off the snow, she struck into my ski prints with one forepaw, lightly as a kitten. Then she dived into them, pretended to pick up something between her forepaws, reared, and with a swing tossed it into the air. Then her playful mood changed and she started on across the Divide. After several steps she stopped, looking back as if she had forgotten something, but was a little too lazy to retrace her steps. But finally she came back. She walked along my ski tracks for a few steps, then began to romp, now and then making a great leap forward, and rolled and struck about with the pretence of worrying something she had captured. She repeated this pantomime a few times, and then, as if suddenly remembering her original plan of action, again walked westward. Arriving at the summit she hesitated, and when I saw her last she was calmly surveying the scenes far below."[218]

W. H. Hudson gives a pleasing picture of the Puma's playfulness in South America, and since it is a very close kin of our Cougar, if not identical, it has value as a side light on the character of our animal. "The Puma is," he says, "with the exception of some monkeys, the most playful animal in existence. The young of all the Felidæ spend a large portion of their time in characteristic gambols; the adults, however, acquire a grave and dignified demeanour, only the female playing on occasions with her offspring; but this she always does with a certain formality of manner, as if the relaxation were

[218] Advent. Nat. Guide, pp. 46–47.

indulged in not spontaneously, but for the sake of the young and as being a necessary part of their education. Some writer has described the Lion's assumption of gaiety as more grim than its most serious moods. The Puma at heart is always a kitten, taking unmeasured delight in its frolics, and when, as often happens, one lives alone in the desert, it will amuse itself by the hour fighting mock battles or playing at hide-and-seek with imaginary companions, and lying in wait and putting all its wonderful strategy in practice to capture a passing butterfly."

Speaking of the Puma which was kept as a pet for 7 or 8 years, Hudson says: "When approached, he would lie down, purring loudly, and twist himself about a person's legs, begging to be caressed. A string or handkerchief drawn about was sufficient to keep him in a happy state of excitement for an hour; and when one person was tired of playing with him he was ready for a game with the next comer."[219]

In the Eagleton, Pa., case detailed in the section on "Pennsylvania Records," Senator Quigley tells of the whole family frolicking together in their dust bath.

Domestication

It is well known that the Cougar is easily tamed. Edmund Kean, the actor, long kept a pet Cougar. Sir William Jardine says of it: "The celebrated Kean possessed one which followed him loose, and was often introduced to company in his drawing room. We have frequently been in company with the animal. . . . It was extremely gentle and playful, and showed no symptoms of ferocity to the strangers who came to see it. Its motions were all free and graceful, and it exhibited the greatest agility in leaping and swinging about the joists of a large unoccupied room in the old college of Edinburgh.

"'While in London,' observed Mr. Wilson, 'it made its escape into the street during the night, but allowed itself to be taken up by the watchman, without offering even a show of resistance.'"[220]

The tractable and docile disposition of the Cougar has long been known, but it is not generally understood that at one time the creature served mankind as help in the chase. The following extract is history from the "Tradition of the Cheyenne Indians":

"The first help we had in getting a living was brought about in this way: A Cheyenne woman lost a small child that was nursing. Soon after her child died she had found a nest of young kitten Panthers. She waited

[219] Nat. La Plata, pp. 40–41.

[220] Naturalist's Library, xvi, p. 133.

until the mother Panther was away to hunt food; then she went and took one of the young Panthers out of the nest and ran off with it. The young Panther gave a moan or whine which sounded like the cry of the baby she had lost, and the reminder of her dead babe caused the woman to hug the kitten Panther to her breast, and when she did so the kitten Panther, which no doubt was hungry, began nursing the woman. Thus it was taking the place of her dead babe, and an affection for the kitten Panther sprang into her heart, and the woman loved this kitten Panther and she raised it as if it had been her own child, and as it grew up it would kill Deer and other large game and furnished food for the Cheyennes much easier than they could get it in any other way.

"So other women got hold of young Panthers, and raised them the same way as this woman had done. And they not only got by the help of these Panthers their food much easier than they had done previously to their getting the Panther, but they had to take the hide off the Deer and other game they got by the help of the Panther."[221]

Summary

There are three important facts that should be kept in mind while considering the mass of evidence on the disposition of the Cougar.

First, the creature is naturally of a mild and playful disposition when not goaded by hunger, fear, or danger to its young.

Second, all these highly developed animals display an amazing amount of individual variation; some may be fierce and some may be gentle.

Third, all wild animals learn to fear man and let him alone in regions where guns are in general use.

In view of these facts, then, I should expect the Cougar to be more dangerous to man when Cougars were more numerous and man less perfectly armed than now.

Strange Instances

The most amazing and amusing example of Cougar effrontery I ever heard of comes from Vancouver, B. C. In the famous and beautiful Stanley Park of that city is a well-planned and thriving Zoo; the Deer are happily placed in paddocks instead of cage yards, and among these, as in a private preserve of his own, a wandering adventuresome Cougar decided to settle down and enjoy life after his own fashion. The story is thus told in a current magazine:

"A very unusual incident, the hunting and shooting of a Cougar in a

[221] Translated by John H. Seger, Arapaho Bee Print, Colony, Okla., 1905.

city park, took place at Vancouver. In the world-famed Stanley Park the keepers some time ago discovered a dead Deer. Poison was laid and traps were set, but the marauder escaped and the continual toll of dead animals, despite all-night watching and various other expedients, baffled everyone. At length a hunt on a large scale with Dogs and experienced hunters took place. The animal was "treed" and one shot fired, with the result of wounding the animal. The Cougar dropped from the tree, wounded one of the Dogs badly, and escaped up another tree. Four more shots were put in and the animal fell dead. For a hunt like this to take place in a park near a city the size of Vancouver shows how near we are to the time when wild animals roamed with perfect freedom over the places where cities now stand. Apparently the animal crossed the Inlet at low water and looked upon the Park as his own preserve."[222]

R. H. Billings, in his interesting Cougar article, thus gives an experience of his guide Terrioux in the Cascade Mountains. Terrioux had just landed a fine trout and "put it on a rock several feet behind me so if it came to life again it couldn't wiggle back into the creek. I threw my line in again but I guess my fishing tackle did not appeal to them as I did not get another bite. I was thinking of going back to camp when I heard a noise behind me. I looked around but as the light was getting dim I could not see much. I was about to reach for my fish when I glanced up and saw one of the largest Cougars I had ever seen. He was only a few feet from me and was sneaking up to get my fish; when I saw that beastly Cat trying to make away with my fish, I was so mad that I did not stop to think of the consequences, but brought my fishing pole down on his head with all my might. For a long time afterward I could not see how I had the nerve to do it, but I was so peeved that I did not stop to think. The Cougar made one jump and was out of sight before I could get in another whack at him; he was so surprised that he left my fish behind him. He did not stop to argue but he spoiled my appetite for lunch. I kept a good fire going all night, and several times I could hear the big Cats yowling. About daylight I saw one of them sneaking down toward the creek. I grabbed my rifle and got in a quick shot, dropping him in his tracks. As I shot him I saw another one go like a streak of lightning up the side of the mountain. I managed to stop him just as he got to the top of a little ridge that he was making for. He was shot in the shoulder and rolled around in the snow, biting at his side; another shot stretched him out. They were large ones and evidently mates."[223]

R. B. Marcy writes: "John Bushman, our interpreter, was much

[222] Rod & Gun in Canada, January, 1912, p. 918.

[223] Field & Stream, April, 1918, p. 102.

surprised to-day, on calling a doe toward him with a deer-bleat, to see a small fawn following after its mother; but imagine his astonishment when immediately behind the fawn came a huge Panther bounding rapidly toward him, and in a twinkling he fastened his claws in the vitals of his victim. He, however, in this instance, caught a tartar, and paid dearly for his temerity, as John, with a spirit of indignation that would have done credit to the better feelings of any man, raised his rifle, and, instead of killing the Deer, which was entirely at his mercy, planted the contents in the side of the Panther.

. . . . . .

"The Bear, the Wolf, and the Panther often come at the call of the bleat, supposing they are to feast upon the tender flesh of the fawn."[224]

[224] Expl. Red River, 1854, pp. 66–67.

Chapter the Last

This is the end of my attempt to compile and give with reasonable fullness a history of this animal; to put together the few scattered fragments that have been collected of the great mosaic, that in its completeness should reveal to us the powers and mind of our fellow hunter, the Cougar.

But vast and baffling are the gaps; great vacant spaces cover most of the field. Outside of what it kills, and how to kill it, I find little indeed on record. A score of questions come up, the answers to which should be the key to many other secrets.

When and why does it purr? Does it have a succession of sounds; that is, a song, to express joy and vigour? What is the meaning of spitting, if it does spit? Why does it lash its tail? Can it really see in the dark? How does it communicate with its fellows other than by sound? Does it go to special trees to splash them with urine? Does it bury its dung? Does it use odour posts? What are its diseases? How does it combat parasites? How does it medicate itself? Does it use sun bath, water bath, or dust bath? Does it ever form friendships with other animals? Does it ever assume the duty of protecting man? Does it store food for the far future? Does it pair for life? Does it resent encroachment of other Cougars on its hunting grounds? Does it ever make long, adventurous journeys hundreds of miles from home? Are there bachelors or old maids among them? What are its amusements? Has it any social games or meeting places? To what age does it attain? How do most die?

The answers are yet to be found out, and the larger, undreamed-of fields to which those answers would lead are yet unknown.

For thirty years I have kept in touch with all that has been written or is known of the American Cougar. The result has been a huge mass of material, enough to make several octavo volumes, and of this mass now before me, and herewith given you in condensed form, fully 99 per cent. deals with how we may hunt, pursue, murder, destroy this wonderful, beautiful animal. Of the 1 per cent. remaining, about one half deals with alleged, more or less doubtful, attacks of this splendid creature on man, or his material interests in the form of flocks and herds. Less than half of one half of the remainder deals with the real animal, its home life, its gentleness, its

amusements, its struggles, its gropings after something better than the world in which its superb animalism makes it king supreme.

I am smitten with indignation and shame when I realize these things. I say to our authorities in charge of such matters, who publish proudly every year their shocking lists of Cougars killed in the West: "Yes, I suppose so—it is so and must be; your masters demand that you do it. But meanwhile, what have you wise men added to our knowledge of this glorious exemplar of the laws that made the world? With all your opportunity, and your covert admiration of the noble brute that you hound with blatant advertisings to its death, what have you given to another generation of its inner life, its home life, its conquest of the laws of heat and space, its perfect motherhood and—I think—at times, its perfect fatherhood?"

All that is known, every shred of fact recorded known, I have gathered, so far as I have been able, into these meagre pages, and, reading them, I blush for those I herd with. "Kill, kill, kill," is their cry, their only doing, and their cry. Fifty pages there are of senseless, brutal killing, and only one of "Stop! Are we not robbing our people and ourselves of something more beautiful and more worth while than countless works of human art on which we have so wisely lavished untold gold?"

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LIFE III—THE OCELOT

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Ocelot, Chibiguazu, Tiger-cat, or Leopard-cat

Felis pardalis Linnæus

(L. *Felis*, a Cat; *pardalis*, leopard-like)

Felis pardalis Linnæus, 1758, Syst. Nat., ed. 10, I, p. 42.
Type Locality—Mexico [Vera Cruz]

Mexican Native Names, *Tlacoozlotl*, *Tlalozelotl* (Hernandez), *Tigrillo*.
Spanish-American, *Chibiguazu*.
Costa Rican, *Manigorda* or "Fat Paws."[1]

"Some of the Guaranese call the domestic Cat *Chibi*, and others *Mbaracayá*. In the same manner, some give the present wild animal the name of *Chibi-guazu*, and others that of *Mbaracayá-guazu;* both appellations signifying *Great Cat.*"[2]

This beautiful Cat is known at once by its size—that is, it is twice the size of a House-cat or about the same as a Bobcat—by its remarkable decoration of hollow blotches, stripes, and spots, and its long, leopard-like tail. Seen at a distance, it might pass for a small Leopard, whence one of its names. At closer range, it is a big, long-tailed gray Cat, with chains of brown along its sides.

In addition to the characters of the genus *Felis*, the Ocelot has the following:

Size. A ♂ of the Northern race is about 50 in. (1271 mm.) in total length; tail, 15 in. (381 mm.); hind-foot, $5\frac{1}{2}$ in. (140 mm.); height at the shoulders, about 18 in. (457 mm.).

The ♀ is smaller; that is, about 40 in. (1016 mm.), in total length; tail, 13 in. (330 mm.); hind-foot, 5 in. (127 mm.).

Weight. A large and very fat male is given by Azara at 35 lbs., the females are less.[3]

Colour. It is of little use to detail the colour, spots, or pattern of this animal, since no two are alike.

[1] E. R. Alston, Biol. Cent. Amer., p. 60.

[2] Azara, Nat. Hist. Para., p. 226.

[3] As above, p. 229.

PLATE XVIII—OCELOT IN HIS CACTUS HOME

MAP V. RANGE OF THE OCELOT IN NORTH AND CENTRAL AMERICA

By E. T. Seton, with assistance of the Biological Survey, 1920

The Texan records are chiefly from Bailey's N. A. Fauna, No. 25.

The name *albescens* Pucheran may displace *griffithii* Fischer; the type locality is Arkansas.

The Ocelot coat is the most wonderful tangle of stripes, bars, chains, spots, dots, and smudges. It has generally four stripes on the neck, two or three long links of black sausages down the back, and along the sides chains of black-edged, brownish blotches which look as though they were put on as the animal ran by. All else is dabs, smears, and broken rings of black.

Before me now is a beautiful ♀ from Escuinapa in Sinaloa on the west coast of Mexico, about lat. 22° (Am. Mus. 24651). In general, it is of a soft gray shaded into white on the lower parts, and tinged with buff strongly on the head, neck, and back, and slightly on the outside of the legs.

Everywhere it is spotted or striped with black; the black spots on the belly are an inch across; on the legs and crown, the size of peas; the stripes are longest on the back of the neck and widest down the spine; as usual, there is a black stripe across the throat and another across the chest; on the tail are 6 solid and 4 broken bars of black, none of them complete on the under side.

But the most characteristic markings are the long irregular chains of black-edged brown blots along the flanks.

The usual cat-mark—that is, a dark back to the ear with a light spot on it—is here rendered into black and white.

Compared with some of its South American relatives, this Ocelot is small and very pale in colour.

A male collected at Fort Verde, Ariz., is a better representative of the race *griffithii*, for it is much smaller than the Escuinapa female, much paler in colour, and its fur is much deeper and softer; altogether it is the coat of an animal that expects to face a winter of frost and snow.

A Sonora specimen before me is quite different in details of colour and pattern from the foregoing female, and yet the verbal description applies equally well to both.

Races

The following races have been recognized by Dr. J. A. Allen in his "Notes on the Smaller Spotted Cats of Tropical America":[4]

pardalis Linnæus, a large strongly coloured animal. T.l., Vera Cruz.

griffithii Fischer, a pale form of smaller medium size, found north to the Rio Grande Valley and well into Texas; and even to Arkansas. T. l. (northern) Mexico (=*albescens* Pucheran).

mearnsi Allen, a large dark form. T. l., Talamanca, Costa Rica.

[4]Bull. Am. Mus. Nat. Hist., vol. XLI, art. VII, pp. 341–419, Oct. 3, 1919.

sanctæ martæ Allen, a very small pale form. T. l., Bonda, Santa Marta, Colombia.

maripensis Allen, a large dark form. T. l., Maripa, Caura District, Venezuela.

tumatumari Allen, a large dark form with exaggerated dark markings. T. l., Tumatumari, British Guiana.

aequatorialis Mearns, similar to *mearnsi*. T. l., Paramba, Ecuador.

pusæa Thomas, a small pale form from the south coast region of Ecuador. T. l., Chongon, Ecuador.

chibigouazou Griffith, a light-coloured form. T. l., Paraguay.

Range, with Map

Thus the Ocelots in various races are, or were, distributed throughout the low forests of the Southwest from Arkansas southward over Central America, and most of South America, as far as Paraguay.

In primitive days, and as late as 1857 at least, the Ocelot was found throughout the lower country of Texas, and ranged as far north as Red River.[5] It was recorded from Arkansas,[6] and had occasionally been taken in Louisiana. It was so well known that a part at least of its glossy decorated robe was the proper saddle finish of every gay-clad horseman who rode the Southern plains; and the creature was as much a part of the native wild life as the Fox is of New England to-day.

In 1845, J. W. Audubon described it as quite well known in Texas.[7] In 1859, A. Schott, a naturalist on the Mexican Boundary Survey, says:[8] It is "quite common through the Western wilds." In 1905, Bailey says Ocelots were still found over southern Texas, and on the authority of Merritt Cary, gives it as fairly common along the lower Pecos.[9] In these remarks we find reflected, however, the steady shrinkage of its territory, as well as the dwindling of its numbers.

E. W. Nelson writes in 1918:[10] "In the lower Rio Grande Valley of Texas the Tiger-cat is rather common." But from all other places within

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[5] Baird, Pac. R. R. Rep., VIII, p. 87.

[6] Zoöl, 1885, p. 149. Voyage autour du Monde sur la Frégate La Vénus, M. Isidore Geoffroy St.-Hilaire.

[7] Q. N. A., II, p. 260.

[8] Mamm. Mex. Bd., p. 10.

[9] Texas, p. 166.

[10] W. A. N. A., p. 416.

our limits it is so nearly gone that it is worth while spotting the map with every record made this century.

Records in the United States

Those shown on the map are taken from Bailey's "Texas," pp. 166–67. The statement runs:

"The Ocelots are still found in brushy or timbered country over southern Texas, as far north as Rock Springs and Kerrville, and up the Pecos Valley to the region of Fort Lancaster. One killed near the Alamo de Cesarae Ranch in Brewster County, between Marfa and Terlingua, in 1903, was reported by G. K. Gilbert, and later its beautiful light-gray skin was purchased from Mrs. M. A. Bishop of Valentine. This seems to be the westernmost record for the State. Farther east, Ocelots are still reported as very rare about Beaumont and Jasper, near the eastern line of the State, and farther north, near Waskom and Long Lake. Early records carried their range across into Louisiana and Arkansas, but it is doubtful if at the present time they are to be found in the United States beyond the limits of Texas. Most of the records are from hunters, ranchmen, or residents of the country, who know the animal by the name of Ocelot or Leopard-cat, or describe it as a long-tailed, spotted Cat the size of a Lynx. In 1902, at Sour Lake, N. Hollister reported 'several so-called Leopard-cats killed near there' and says: 'They are described as about the size of the Wild-cat, but of a different build, spotted and with a long tail.' Near Beaumont, Harry C. Oberholser reported them as occasionally killed in the woods along the Neches River. In Kerr County, Mr. Moore, the sheriff, told me that he saw a beautiful skin of a large, long-tailed spotted Cat that was killed 10 miles south of Kerrville the latter part of June, 1902. At Rock Springs in July of the same year, Mr. Gething told me that each year a few Ocelot skins were brought into the store for sale. In his report from Sheffield, Merritt Cary says: 'I am informed that Leopard-cats are fairly common in the cedar brakes along the Pecos southeast of here.'"

Numbers

If one be guided by what is seen of this animal as one travels through its country, it is, of course, extremely rare. But all observers agree that it is an adept at keeping itself hidden; it is rarely seen, even in such countries as Paraguay, where, according to Azara, it is so common that his friend, Noseda, caught 18 individuals in 2 years, within 2 leagues circumference of his pueblo or village.[11]

[11] Nat. Hist. Para., p. 226.

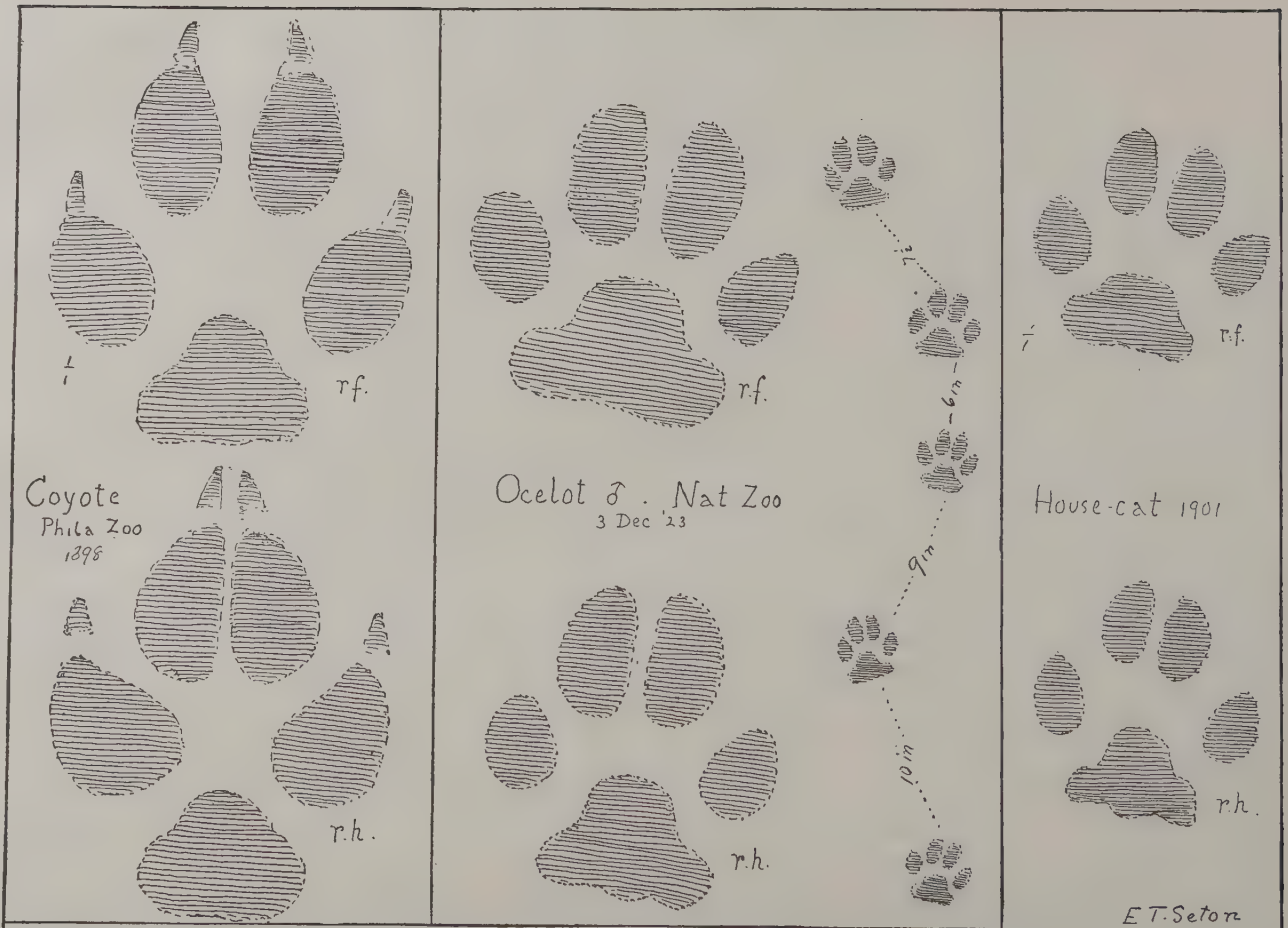

Plate XIX. Tracks of Ocelot, Coyote & House-cat, for comparison; all are life-size

Haunts

His favourite surroundings are impenetrable thickets so dense that Dogs can hardly get in and hunters not at all.

In a square mile of chaparral, a dozen Ocelots might pass their whole lives unknown to any man; for they need never venture out and hunters cannot venture in. Their every forthgoing is nocturnal, so that they easily escape all notice of their arch-enemy. Indeed, the Ocelot has the reputation of being able to conceal himself more effectively than any other large animal in America.

To complete his furtive modes of life, he loves the darkness so wholeheartedly that moonlight, and even starlight, seem to put a check on his enterprise and daring. Having passed the day behind the safe barb-wire entanglements of his chaparral home, he waits till the evening light is gone and the dusk has given place to dark. A black and stormy night is much to his taste. On such a night, he will boldly risk the Dogs that guard the barnyard, and make poultry raids that he would never dream of in calm weather or moonlight.

How he finds his various prey aloft in such a time of noise, wind, and blackness, is a puzzle, and a tribute indeed to the accuracy of the creature's senses. Yet he does find them, and according to all authorities, climbs the trees, going direct to roosting fowls, carrying off half-a-dozen in a night, and leaving sometimes a number killed that he could not carry off—just as some other burglars, when alarmed by danger of discovery, may hurry off, leaving a part of their swag behind them.

The Ocelot is a forest-loving animal, and is just as much a tree-climber as our common Cat, which means that he is not in the Squirrel and Monkey class, but he can climb easily and quickly whenever his purpose is served by so doing. He often goes bird-nesting up aloft; he even takes a noonday nap upstairs, and commonly betakes himself to a tree when in danger from his racial enemies of the Dog tribe. Ordinarily, however, his life is spent on lower levels. He frequents dense cover—either heavy timber, thorny thickets, or rocky hillsides—preying chiefly on the lesser foresters that are forced to acknowledge him their overlord.

It must not be supposed, however, that the opening yelp of a pack of hounds on his trail sets the Ocelot scurrying up the handiest tall timber. This royal Cat is much at home on the ground. He can run like a Fox, can blind-hop, back-track, and double-cross his trail. He is, moreover, so adept at threading the murderous bayonet-clad cactus, mesquite, huisache, and nopal thickets, which are double-edged, sharp-set, and poison-barbed for

Dogs and huntsmen, that in a finish show-down where he has choice of ground, he commonly mocks at all the hunt, and sends the wretched baffled Dogs back home with as many rips and jags from thorns as though the Tiger-cat himself had mauled them at his own good vigorous pleasure.

Sometimes, however, the hounds are over-many, or the mesquite patch too small, so the Ringtailed King of the Underbrush must take a chance on an overland straightaway. Here he shows that he can hold his own with the speediest—for a time. But he is a sprinter, the hounds are bred for cross-country Marathon work; and within a mile, if no new friendly thickets intervene, the race is up, and the Ocelot, like all the Cat-kind when Dog-harried, accepts the high hospitality of some convenient tree. Here he is perfectly at home and would be safe but for the hunter and the rifle, that inevitable combination of Dog, man, and gun that so unfairly, fast and ever faster, is depopulating, yes, desolating, our one-time joyous wilds.

So far as known, the last refuge of an Ocelot is never a hole in the ground, never in the water, rarely in a hollow trunk, but nearly always in the high branches of a large tree.

His Mild Disposition

When one reads of the terror spread in Africa, and notably on one occasion in the camp of the Roosevelt expedition, by a single Leopard weighing under 70 lbs., one turns to the strong-built, husky-looking Ocelot with increased respect. The reflected glory from its African cousin makes one expect to find a creature of amazing prowess, for often he weighs half as much as the Leopard. But here we meet a disappointment. The Ocelot is one of the mildest-mannered Cats that ever cut a throat or lapped hot blood. For this reason, indeed, Cuvier called the species *mitis*, which means "tame and gentle." Even when subjected to the aggravations and indignities of cage life, his patient spirit does not openly rebel or seem to become embittered. As Bachman remarks, and most of us have seen, he never rages against the bars, or strives to strike out through them at the incautious onlooker who ventures overnear as do Wild-cat, Leopard, and others of his kin.[12]

His Simplicity and Good Nature

All the details we have of this superb creature combine to picture him as a big, simple-minded, good-natured Cat.

Azara gives a long account of those he kept in a large cage during his

[12] Q. N. A., II, p. 261.

stay in Paraguay. I do not know of any other Cat of which it would be safe to keep an indiscriminate dozen in one cage, especially when all were wild and newly caught. Yet they seem to have lived quite amicably together. "They spent almost the whole day," he says, "lying rolled up in the shape of a ball; and the one which wished to stretch himself did not do so until he had first licked the Chibiguazu at his side," which politeness we might doubt had we not seen that very same thing among our domestic Cats.

Our writer continues: "They spent the twilight and night in walking to and fro, close to the sides of their den; and if another Chibiguazu crossed or interrupted this exercise in any way, they puffed and made gestures like a Cat when irritated, without using their paws; but they never quarrelled, except when very much irritated, and then they struck at each other with their fore-paws."[13] On page 227 he offers this evidence of their guilelessness.

"Some of these escaped and were caught again two or three times in the same trap, being recognized by cuts in their ears and other signs."

In all their habits and manners they were like big House-cats. They licked and dressed their fur, washed their faces with their paws, sniffed, puffed, yowled, and snorted like our fireside friend; which probably implies that they also mewed, caterwauled, and fought like Cats in the mating season; and, of course, their eyes shone at night.

Noseda, Azara's friend, caught an Ocelot kitten. "It became so thoroughly domesticated," he says, "as to sleep in the skirts of his clerical gown and went about loose; and he affirmed that no animal could be more tractable. The neighbours, however, killed it, as it devoured the poultry."[14]

Nelson remarks that in a wild state "the Tiger-cat is much more quiet and less fierce in disposition than most felines. It excited my surprise and interest whenever I trapped one, to note how nonchalantly it took the situation. The captive never dashed wildly about to escape, but when I drew near, sat and looked quietly at me, without the slightest sign of alarm and with little apparent interest. A small trap-hold, even on the end of a single toe, was enough to retain the victim. On one occasion, while a Cat thus held sat looking at me, it quietly reached to one side and sank its teeth into the bark of a small tree to which the trap was attached, and then resumed its air of unconcern."[15]

Nevertheless, it is well to avoid the mistake of confusing this philosophic calm with mere poltroonery, for Howard Lacey, the hunter-naturalist of Kerr County, Texas, writes: "They are heavier and more muscular than

[13] Nat. Hist. Para., pp. 227–8.

[14] As above, p. 229.

[15] W. A. N. A., p. 416.

the Bobcat, and our hounds, that always make short work of a Bobcat, find the Leopard-cat a tough proposition."[16]

Food Habits

Chiefly a Cat-of-the-night, the Ocelot takes most of its prey on the ground and in the woods. A full list founded on stomach contents, analyzed by experts, would certainly comprise every bird and reptile in its range and every four-foot small enough for it to master. From this I suppose we must except the harpy eagle, the poisonous snakes, the Skunk, and the Southern Porcupine, for the obvious reasons that they have weapons quite adequate even to such an occasion as an Ocelot.

Lacey says: "These Cats do much damage to the stockmen, being especially fond of young Pigs, kids, and lambs. They probably also kill fawns and turkeys, and, like many other Cats, often hide what they cannot eat under a heap of leaves."[17]

Other observers make much mention of its toll of birds and bird-nests, and E. W. Nelson says:

"By night it wanders along trails over a considerable territory, seeking its prey. Birds of all kinds, including domestic poultry, are captured on their roosts, and Rabbits, Wood-rats, and Mice of many kinds, as well as snakes and other reptiles, are on its list of game.

"Its reptile-eating habit was revealed to me unexpectedly one day, in the dense tropical forest of Chiapas. I was riding along a steep trail beside a shallow brush-grown ravine when a Tiger-cat suddenly rushed up the trunk of a tree close by. A lucky shot from my revolver brought it to the ground, and I found it lying in the ravine, by the body of a recently killed boa about 6 or 7 feet long. It had eaten the boa's head and neck when my approach interrupted the feast.

"The first of these Cats I trapped in Mexico was captured the night after my arrival, in a trail bordering the port of Manzanillo on the Pacific Coast. The rejoicing of the natives living close by evidenced the toll this marauder had been taking from their chickens."[18]

Azara comments thus on the food habits of his captive Ocelots: "When first caught, they devoured 5 pounds of flesh per day; but afterward 3 were enough. We prepared a ration for each of the 12 or 14 individuals, and they took it with their paws according to [i. e., in order of] the length of time they had been in confinement, without the others offering them the slightest in-

[16] Texas, p. 167.

[17] As above.

[18] W. A. N. A., p. 416.

terference; but if the animal whose turn it was to receive a portion disregarded or did not devour it immediately, another snatched at it, and the lawful proprietor made no defense save by sneezing and occasionally by blows with its forepaws."[19]

Adjoining the cage he made an enclosure into which he put Rats, fowls, ducks, young Dogs, or other live food, then opened the Ocelot cage so they might enter and kill. Each Ocelot selected and attacked a victim. Dogs as big as themselves, however, they did not touch, for each Ocelot masters his prey alone. Small Dogs or Cats were seized by the nape of the neck in the Ocelot's jaws, pinned flat to the ground, and held, body and limbs, until dead. Birds were plucked clean of their feathers before being eaten.

"Cat's flesh," he says, "seemed to produce the itch, which fretted them, making them mew like Cats, and finally destroying them. They also ate snakes, vipers, and toads; but these occasioned violent and continued vomiting, so that they wasted away to complete skeletons and in a few days perished."[20]

The Den

The home den of the Ocelots is nearly always in a rocky cave, though there is some reason for believing that occasionally they content themselves with a hollow tree. Wherever it is, no doubt it is comfortably lined, for Azara's captives were very dainty about their bedding. Whether supplied with straw, twigs, or sticks, they carefully worked it and chewed it over bit by bit, till every part of it was reduced to chips a quarter of an inch long. So interested were they in the material of the couch that the attendant needed only leave it within reach outside the bars. The Ocelots would drag it through and proceed to prepare it in the manner they thought best.

Young

In Northern lands, Mother Carey arranges the love season so that the offspring arrive in the pleasantest, mildest seasons of the year. But far south, in the warm and snowless lands where dwells the Ocelot, no season is hard, so come when they will, the little ones are welcome and well-fed. From which I argue that they come at any time of the year. Yet all the evidence at hand goes to show that the 2 young ones—always 2—arrive in September or October, and reckoning back then, by analogy, their parents went honeymooning in the lovers' month of June.

[19] Nat. Hist. Para., p 228.

[20] As above.

The following paragraph is good corroboration of this, and maybe sets us thinking, wondering, and questioning.

Says H. Lacey: "I have never had the luck to find any kittens, but a friend of mine ran a female into a cave with his hounds and killed her; then the Dogs went into the cave and killed and brought out 2 kittens a few weeks old. This was in November. On another occasion he killed a female that in the course of a few days would have brought forth 2 kittens. Another of my neighbours killed a female and 2 kittens in a cave near here. This was also in November, and the kittens had not yet got their eyes open."[21]

Strange Instances

Azara was amazed to find that his captive Ocelots always "preferred easing themselves in their drinking vessel."[22] At first sight this seems a very unclean habit, and yet it proves to be the remnant of a very necessary effort at sanitation. All of the Cats are very clean. When they can bury their dung, they do so; and when they cannot, some, at least, drop it in water—a habit more fully noted in the "Life of the Bobcat."

Lacey remarks on the strong odour of the creature. He says he never killed one without being reminded of the Lion house of the London Zoo.[23]

Cactus Prickles. It will be noted that Chibiguazu, like Molly Cottontail, takes to the brier bush whenever in doubt or in danger. Said thorn bushes are ready to strike deep and often any unwise stranger rushing in, so that one is not greatly surprised to learn that even the low-gliding Ocelot does not always escape from the weapons of his undiscriminating friend.

A. Schott of the Mexican Boundary Survey killed a persecuted Ocelot in a thorny thicket where it had taken refuge from the Dogs, and adds: "In taking off the skin of this specimen, I found its inside all covered with opuntia prickles, which naturally barbed as they are had worked themselves in with the movements of the skin. The animal, however, did not seem to have suffered any by this otherwise dreaded annoyance, for all the prickles lodged themselves horizontally or in an oblique direction into the skin, so that the points would not reach the muscles and nerves. I observed subsequently the same circumstance on other animals, which accounts for the readiness with which they take to these bushes, unapproachable for men."[24]

Note: George K. Cherrie tells me that while collecting near Mato Grosso, Brazil, he heard a great noise among the jays. They were mobbing some creature on the ground. Through the underbrush, Cherrie at length got several glimpses of a big snake gliding by, and decided that it was a 20-foot boa. Then it crossed an opening, and stood revealed—not a snake, but an Ocelot!

[21] Texas, p. 167. [22] Nat. Hist. Para., p. 227. [23] Texas, p. 167. [24] Mamm. Mex. Bd., p. 10.

PLATE XX.—OCELOTS, SHOWING VARIETIES OF PATTERN

Nos. 1, 2, 3, 4 & 6.—All males, taken in Peru by H. H. Heller

All rights reserved by H. H. Heller

No. 5.—Taken in New York Zoological Park by Elwin R. Sanborn

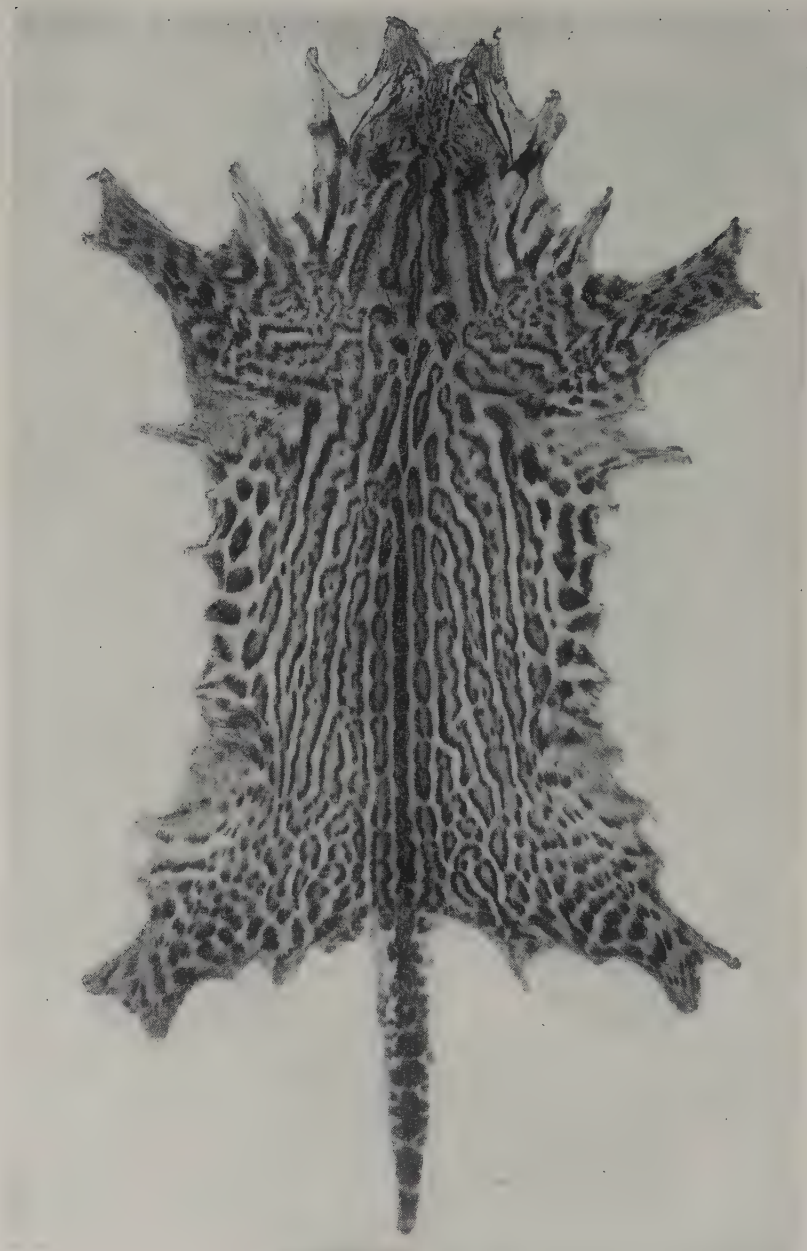

PLATE XXI.—SKIN OF OCELOT FROM DESCALVADOS, MATTO GROSSO, BRAZIL

Cut loaned by the American Museum of Natural History

From Allen's "Smaller Spotted Cats," 1919, p. 403

Not only are no two Ocelots exactly alike in the pattern of their spotted coats, but the two sides of the same animal are wholly different in detail, as illustrated in this plate

His Fatal Beauty

"Harmless and beautiful" is a fair summing up of the Ocelot, if we can forgive his few and scattered raids on the poultry house, We have so far depleted his own lawful stock of wild poultry that he is driven by starvation to levy on ours.

Innocent of any violent offence against the sacred person of man, or of any heavy damage to his herds, the Ocelot is yet retreating on that long, last sunset trail with all the rest. And here the immediate obvious cause seems to be the beauty of his ring-straked hide with its mottlings and frecklings of black and concatenating blots of brown. "The most beautiful velvety furred thing in our woods" is the appraisal of it by the hunters in the South. As much is given for an Ocelot as for a Jaguar or a Panther skin, says Schott,[25] and the trapper, frontiersman, or saddle-dandy of the sunny Rio Grande Plains did not consider himself dressed unless the silver of his gear was shining on a background of soft gray fur, the black-blotched velvet robe of an Ocelot.

Home Life

So far this compilation of many records gives nothing but the outside hostile view of a jealous rival hunter, or at best, the observations of a jailer. How much have we learned of the Ocelot's home life? for assuredly it has one, and if analogy count for aught, that home life must be nearly ideal. Among the wild things, anything supposed to make marriage a failure is not only grounds for divorce—it *is* divorce. Therefore, a wild male and female living together are happy, or they would not go on.

The following fragments are the only testimonies I find on this important matter.

The courteous and enthusiastic Azara tells us that in Paraguay, the Ocelots, or Chibiguazus, as he calls them, pair; and that "each pair lives in a separate district, as may be inferred from the male and female, and no more, being always caught on the same spot."[26]

Lacey supplies the following suggestive episode: "Once on the head of the Frio River in Nov. [1902] the hounds struck a hot trail and were just beginning to get off well together on it when a splendid male Ocelot sprang into a large cedar close to us. Thinking the hounds might be on a Bear trail, I shot the Cat at once, put him behind me on the saddle, and made after the hounds that were getting off at a good pace. They ran about 2 miles and

[25] Mamm. Mex. Bd., p. 10.

[26] Nat. Hist. Para., pp. 226–7.

then treed a female Ocelot in the bottom of a steep canyon. This also we shot, and I think the two were together when we started them, and that they often go in pairs."[27]

How easy it would be to rewrite that incident from the other point of view; to tell it as the Ocelots saw it: the devoted pair hunting side by side, happily living their lives together: then the sudden invasion and hideous uproar of the hounds, any one of them twice the size of an Ocelot, and the ruthless yelling hunter with his irresistible weapons, taking no risk whatever. The brave fighting male, trying in vain to cover her retreat to safety. The useless double tragedy; and worse than double, for it may be that in a far-off rocky den two little Ocelots waited for the mother's home coming, and wailed in vain, as hunger beset them, and louder wailed—for a time. Then their whimpers died away—died dead away.

It is easy to see it so, for every scrap of evidence, direct or collateral, that we can find, tells this: that written in that way, the story would be true.

References for Ocelot

1801—Natural History of Paraguay, by Azara. (See "References for Jaguar" for full title.)

1849—Quadrupeds of North America, by Audubon & Bachman, II, pp. 258–62.

1859—Mammals of Mexican Boundary, by S. F. Baird, pp. 8–10.

1905—Biological Survey of Texas, by Vernon Bailey, N. A. Fauna, No. 25, pp. 166–67.

1918—Wild Animals of North America, by E. W. Nelson, Washington, D. C., p. 416.

[27] Texas, p. 167.

LIFE IV—THE EYRA

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In the Moonlight

Eyra, Cacomitli, Red-and-Gray Cat, Yaguarundi, Jaguarundi, Otter-cat

Felis eyra Desmarest

(L. *Felis*, a Cat; *eyra*, the native American name given by Azara)

Felis eyra, Desmarest, 1820, Mammalogie, I, p. 231.
Type Locality—Paraguay, S. A.

This singular and graceful little Cat looks like a cross between a Cougar and a Weasel. It is noted for the two wholly different-coloured pelages in which it appears: a red and a gray. These have no reference to age, sex, or season, but are a clear case of dichromatism, *i. e.*, of blonds and brunettes in the same family; exactly paralleling that of the screech owls, red and gray. It is worthy of remark here that all of the true Cats on our list except the Ocelot have a double colouration. In the Lynxes it has not yet been recorded. In the case of the spotted Cats, Leopard, Jaguar, etc., these alternate ground colours are yellow and black; in the Cougar and Eyra, red and gray.

The pupil of the eye is never linear but is circular, no matter how small, according to Azara.[1]

In addition to the generic characters, the Eyra has:

Size. *Total length*, 35 to 54 in. (888 to 1372 mm.); tail, 13 to 24 in. (330 to 609 mm.); hind-foot, 5 to 6 in. (127 to 152 mm.). That is, it is about double the size of a large House-cat and has a very long tail.

A large ♂ taken at Rio Grande border, Cameron County, Tex., Feb. 5, 1889 (Am. Mus. 3418): Length of body, $32\frac{3}{4}$ in. (830 mm.); tail, $22\frac{1}{2}$ in. (572 mm.); ear, $1\frac{3}{8}$ in. (34 mm.); hind-foot on dry skin, $5\frac{3}{8}$ in. (137 mm.); total length on dry skin, 50 in. (1270 mm.).

Colour—the red phase. General colour, a tawny or rusty brown tinged with a deeper reddish on neck and back, more or less peppered with blackish tips to the hairs; shaded into lighter tawny on the under parts, on the throat and lips nearly white, on the head and legs the colour is more olive than red; There are faint suggestions of dark spots on the chest and inside the arms.

The *gray phase.* A Brownsville specimen in the gray coat is everywhere

[1] Nat. Hist. Para., p. 243.

Plate XXIV. Eyras.

of a dull gray like a Deer in the "blue coat," thickly peppered everywhere with blackish, even on the belly, and darker on the feet.

In another gray ♂ from Chiriqui, Boqueron, Panama, the gray is much darker, becoming nearly clear black on the hind back, on the upper part of the tail, and on the legs.

Races

For the region north of Panama, but one race is recognized:

eyra Desmarest is the typical form from Paraguay, S. A.

cacomitli Berlandier, a pale Northern race. T. l. Matamoras, Tamaulipas, Mex.

Range, with Maps

Apparently it is found in one form or another, and generally distributed, in all the forest region, from Paraguay to the Rio Grande. Baird gives it as occurring, but rare, along the Rio Grande, near Matamoras, Mex.[2] J. A. Allen records the taking of a male at Rio Grande, Cameron County, Tex., Feb. 5, 1889.[3] Mearns describes an adult female taken at Brownsville, Tex.[4] Bailey records that in the U. S. Nat. Mus. are a dozen specimens from southern Texas and eastern Mexico.[5] Nelson says it is found in southern Texas associated with the Ocelot, and about Brownsville is probably more common than is generally supposed.[6]

Haunts

This elegant Weasel-cat is at home in the dense thorny thickets of the lower Rio Grande. Mesquite, cat-claws, granjeno, chaparral, acacia, ironwood, cactus—oh, how they all run thorny in that country!—are fearsome as barb-wire to man and the bigger beasts, but to the little Eyra they are the armed and friendly sentinels of his castle doorway, or the wire entanglements of his safest entrenchment.

Partly due to the fact that its home garden is impenetrable to man or Dog, and partly due to its elusive, furtive, and almost strictly nocturnal habits, the slim Eyra is supposed to be extremely rare. But F. B. Armstrong, the naturalist, of Brownsville, Tex., by persistent trapping, proved

[2] Mamm. Mex. Bd., p. 11.

[3] Bull. A. M. N. H., vol. III, no. 2, art. XX, June 30, 1891, p. 310.

[4] Proc. Nat. Mus., XXIV, 1902, p. 208.

[5] Texas, p. 167.

[6] W. A. N. A., p. 416.

MAP VI. RANGE OF THE EYRA AND OF THE CANADA LYNX

By E. T. Seton, with assistance of the Biological Survey, 1923

Range of Eyra, in Mexico (barely entering Texas) and southward. The type locality of true Eyra is Paraguay. Range of Canada Lynx, chiefly in Canada, but entering the northern States, and following the Rocky Mts. down to Colorado. The black spots south of the Lynx range are outlying records of Lynx, as follows: Little Missouri, N. D.; Norfolk, Neb.; Carlin, Nev.; Little Owhyee, Ore.; Fort Klamath, Ore.; Hill City, Ida. (Biol. Surv. records).

it to be not uncommon and a regular inhabitant of the region around the Rio Grande mouth.

Food

Its food is said to be Mice, Rats, Rabbits, and birds. This means that it lives like a Weasel on all the small Deer of its hunting ground. Here be it noted that the Shakespearian phrase "small Deer" is of most accurate construction and honourable ancestry, for "Deer" (A. S. *Deor*) meant originally "wild animal."

In view of its occasionally aquatic habits, we shall probably learn that it feeds on fish and crab-kinds. Azara was told that in Paraguay it commonly killed Deer, pouncing on them and riding till they fell. But he expressed the belief that this was true only of fawns.[7]

Mating and Young

Little is known of its mating habits. F. B. Armstrong says they have no regular time for breeding, as he has seen the young both summer and winter, born probably in August and March. Maybe, unlike other Wildcats, they have two broods in a year.

Azara says that in Paraguay they have but 2 young each year.[8]

Concerning its love song, mating ceremonies, nesting place, etc., we have no light. A nearly clear field is offered to the young naturalist who first has good chance to study this elegant creature.

Habits

Though so Weasel-like in form and habits, and living chiefly on the ground, these animals habitually climb trees. Armstrong says: "I have shot them out of trees at night by 'shining their eyes' while Deer-hunting. I capture them by burying traps at intervals along the trails that run through these thick places. . . . They move around a good deal in daytime, as I have often seen them come down to a pond to drink at midday, and often see them dart through the brush in daytime. They are exceedingly hard to tame."[9] However, Azara says that a female which was "caught young, allowed herself to be handled and scratched in 28 days."[10]

To this meagre account E. W. Nelson adds the following: "The natives

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[7]Nat. Hist. Para., p. 243.

[8]As above.

[9]Texas, p. 168.

[10]Nat. Hist. Para., p. 243.

PLATE XXII.—OCELOT
Photograph by Elwin R. Sanborn, New York Zoological Park

PLATE XXIII.—OCELOT HUNTING
From a drawing by Ernest Thompson Seton
Loaned by the New York Zoological Society

in the lowlands of Guerrero on the Pacific coast of Mexico informed me that the Eyra in that region is fond of the vicinity of streams, and that it takes to the water and swims freely, crossing rivers whenever it desires. Its Otter-like form goes well with such habits, and further information may prove that it is commonly a water-frequenting animal."[11]

It will be noted that, except in this last, the Eyra closely resembles the Ocelot in habits as well as in its choice of food.

References for Eyra

1801—Natural History of Paraguay, by Azara. (See Jaguar references.)
1905—Biological Survey of Texas, by Vernon Bailey. N. A. Fauna, No. 25, pp. 167–69.
1918—Wild Animals of North America, by E. W. Nelson, Washington, pp. 413, 415, 416.

[11] W. A. N. A., p. 416.

LIFE V—THE LYNX

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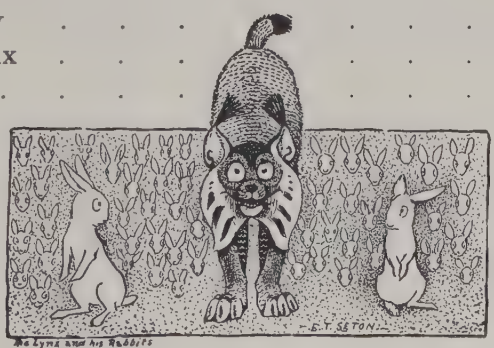

The Lynx and his Rabbits

Lynx, Canada Lynx, Link, Bobcat, Gray Wild-cat, Gray-lynx Lucivee or Loup-cervier

Lynx canadensis Kerr

(L. *Lynx*, the ancient name of its European kinsman; *canadensis*, of Canada)

Lynx canadensis Kerr, 1792, Anim. King., I, pp. 32a, 157.
Type Locality—Eastern Canada

French Canadian, *Loup-cervier, Pichu, Lynx, Chat.*
Swedes of New Jersey, *Warglo* or *Wolf-lynx.*[1]
Ojibway, Cree, and Sauteaux, *Pee-shóo.*
Chipewyan, *Cheé-say.*
Yankton Sioux, *Ee-heé-mo.*
Ogallala Sioux, *Ig-mu-hó-ta.*

The genus *Lynx* (Kerr, 1792) comprises large Cats with very short tails (*i. e.*, less than one half the length of the body), long legs, large feet, usually with tufted ears, and with the following dentition:

$$\text{Inc. } \frac{3-3}{3-3}\text{; can. } \frac{1-1}{1-1}\text{; prem. } \frac{2-2}{2-2}\text{; mol. } \frac{1-1}{1-1} = 28$$

In youth there are 2 additional premolars above.

Size. To these generic characters the Canada Lynx adds thefollowing: Length, about 36 in. (915 mm.); tail, 4 in. (102 mm.); hind-foot, $9\frac{1}{2}$ in. (242 mm.).

Weight. An extremely lean male from Halifax, N. S., weighed 16 lbs.;[2] another from Petersburg Mountains, east of Troy, was 22 lbs.[3] The full-grown but lean female, whose feet appear in Plate XXX, weighed 13 lbs. A young female taken on Great Slave River weighed 15 lbs. A small but adult female which I examined at Calgary, Alberta, weighed 19 lbs. 11 oz. The large but starving male which I secured on the Barren-grounds, Aug. 5, 1907, weighed 22 lbs. One taken at Elkhorn, Man., by Dr. H. F. Gordon, on Sept. 27, 1905, weighed 27 lbs.

Manly Hardy, after handling hundreds, says:

[1] Rhoads, Mamm. Penn. & N. J., p. 139.

[2] Q. N. A., I, p. 138.

[3] As above.

"One winter I had the accurate weight of 10, all large, and the heaviest weighed 25 lbs. I have weighed many others and have never seen one weigh more than my first; while kittens, in winter, weigh 10 to 12 lbs. As for some 30 years I was shipping furs to New York and later to London, I have handled many hundreds of skins, and think 30 lbs. the extreme weight of any Maine Lynx, although I have had skins from the north side of Baie Chaleur which were larger than any taken in Maine, and some might weigh 35 to 40 lbs."[4]

S. N. Rhoads accepts and records the following weights for Canada Lynx in Pennsylvania: "about 40 lbs.," "as high as 44 lbs," but these are exceptionally heavy.[5]

Colour—In summer: Grayish brown, much darker on the head and back (where the long hairs are black with occasional white tips), and shaded into dull whitish below; the ears behind are black, with a central spot of whitish; a spot at the corner of the mouth, the bars on the ruff, and the *whole end of the tail black;* a few dusky spots show on the inside of each limb.

In winter: The colour is much paler and grayer; at all times the tuft of hairs on the ears is long and black; the only black marks being those on the ruff, the ear-tufts and tail-tip.

When seen alive, it looks and behaves exactly like a huge gray kitten. Its tufted ears and short bobtail will distinguish it from its near relatives. It might be mistaken for the American Wild-cat or Bay-lynx (*Lynx rufus*), but its tail is very different and furnishes a sure guide; while the Canada Lynx has the tip of the tail wholly black above and below, and the rest of it grayish-white, the Bay-lynx has the tip black above and white below, and also has other broken bars on the upper part. (See Plate XXX.)

The feet also differ from those of the Bobcat. In the Lynx they look enormous, because they are so enlarged, especially in winter, by a vigorous growth of stiff, expanding hair. That is, they are developed into broad snowshoes, so that even though its weight be 30 or 40 lbs., it walks lightly over soft drifts where a Dog would flounder in utter helplessness.

Races

Three races of Canada Lynx are recognized:

canadensis Kerr, the typical form. T. l., Eastern Canada.

mollipilosus Stone, a browner race. T. l., Wainwright Inlet, Pt. Barrow, Alaska.

subsolanus Bangs, a darker race. T. l., Codroy, Newfoundland.

[4] Forest & Stream, June 29, 1907, p. 1010.

[5] Mamm. Penn. & N. J., pp. 137–38.

Genus **Lynx**

Plate XXVI. Lynx ♂. skull. Fort Smith, MacKenzie.

RANGE (See Map VI, p. 157)

The Canada Lynx is most happily circumspect in its choice of range, for it exactly follows the main area of the Canadian fauna, defining it perfectly except in the case of Canadian "islands" formed by uplands in regions too far south for climatic continuity; that is, cut off by uncongenial climatic and other conditions.

The map given is founded chiefly on records by Dr. J. Richardson, E. W. Nelson, O. Bangs, C. Hart Merriam, J. Fannin, W. H. Osgood, R. Bell, A. P. Low, R. MacFarlane, W. Stone, S. N. Rhoads, E. A. Preble, and E. T. Seton.

In Newfoundland according to J. G. Millais:[6] "Nearly all white men as well as the Indians say that there were no Lynxes in Newfoundland 15 years ago, and that they came to the island about this time from Labrador by means of the icebridge at the Straits of Belle Isle. It is also said that as the Lynx entered, so the Wolves departed. But I do not think that this view is correct, for as long ago as 1622 Captain Whitbourne noted the presence of 'Leopards' in the island and subsequent writers also mention the 'Wild-cats.'

"Doubtless they were very scarce until recent years, but now they are the most abundant of all the carnivora in the island, and do much damage to the game. They live to a large extent on the small varying Hare and grouse, seldom touching carrion until forced to do so by extreme hunger. Everywhere one sees their tracks on the sandy shores of the lakes, and at night and early morning I have often heard their screaming caterwaul. He is a sly, silent beast, is *A-bak-sigan*, the shadow, and his retiring habits hide him from the gaze of man.

"I have little doubt that the great increase in the number of Lynxes is due to the introduction of the small varying Hare which furnishes a good supply of food at all seasons."

Outram Bangs indorses the first paragraph of the above.[7] And Gower Rabbitts, secretary of the Game and Inland Fisheries Board of Newfoundland, writes me, Nov. 14, 1923:

"Lynx were reported about 38 years ago by Micmac Indians near Sandy Lake. About 40 years ago, some had been taken in the vicinity of Halls Bay, and the Indians of that time reported that Lynx had come to Newfoundland from Labrador in winter on the ice. The first taken on the Avalon Peninsula were reported about 34 years ago, and at that time it was currently reported that they had been on the northern Peninsula several

[6]Newfoundland and Its Untrodden Ways, 1907, p. 249.

[7]Land Mamm. Newfoundland, Mus. Comp. Zoöl., Cambridge, 1913. LIV. pp. 512–13.

years before, and it was thought then that they had crossed the Straits of Belle Isle on the ice in winter."

Home Range

The Lynx is generally believed to be a wide ranger. While the young are unable to travel, it would be impossible for the mother to go more than 4 or 5 miles from home, but in the autumn and winter there is reason for believing they will go fully ten times as far in search of good winter locations; that is, good hunting.

I shall never forget my first meeting with a Lynx. It was near Toronto, in December, 1875, although it was commonly believed that they were no longer found within 30 or 40 miles of that city..

Again in June, 1888, I found one at Springfield-on-the-Credit, Ont., as related later.

In *Rod and Gun* (Oct., 1911, p. 525) is a case of wandering detailed by Bertha Lean. Edward Wigg, a trapper at Jack's Lake, Peterborough County, Ont., had a trap carried off by a Lynx. A fortnight later his son, who lives at Cranberry Lake, 11 miles away, killed a Lynx there and on its foot found the missing trap.

Among the "Strange Instances" (given later) is one recorded by Major Allan Brooks, which seems to show that in this case a Lynx travelled some hundreds of miles from the Mackenzie region to Okanagan Lake, B. C.

Haunts

The Lynx is a creature of the primitive woods, the unbroken forest. In this it is unlike its cousin, the Bobcat, which avoids the dense shade and finds ideal conditions only in varied country, half in sun, half in shadow. The Lynx is so devoted to forest gloom that it has invariably receded as the pioneer cut down the woods.

Nothing but the dire necessity imposed by forest fires, flood, or starvation drives the Lynx into the open.

As exceptions to this rule are the following strange occurrences, apparently the result of a mere wanderlust, or else the search for better hunting. Under these circumstances, it is often found 3 or 4 miles out on the prairies. Sir Rodmond P. Roblin, K. C. M. G., ex-Premier of Manitoba, has supplied me with the record of a Lynx killed on his farm near Carman, Man., among some willows, 3 miles from timber and 10 from woodland of any extent. In the end of Oct., 1883, I met with a Lynx on the open prairie 20 miles west of Shellmouth, Man. In the fall of 1905, E. W. Darbey says 2 Lynxes were killed within the limits of the city of Winnipeg. On Aug.

Plate XXVII. Lynx Studies.
by E. T. Seton

5, 1907, I found a large Lynx on the Barren-grounds, a couple of miles from the only timber, a little grove, and 20 miles from the forest.

Most of these far wanderings are the result of a search for food.

Interesting Records

E. A. Spears records the killing of a Lynx at Willseyville, 11 miles south of Ithaca, N. Y., by John Hallet, a farmer, who trapped and shot it after it had raided his chicken yard, Nov. 16, 1906. The specimen was identified by Doctor Wilder and A. A. Allen of Cornell University, in which museum it was deposited.

Length, nose to root of tail, 37 in.; tail, 5 in.; right hind-foot, $9\frac{3}{4}$ in.; weight, 26 lbs.; sex, female.[8]

Harry Chase records an unquestionable Canada Lynx killed in the Green Mountains of Pittsfield, Vt., by Gideon Hutt, Oct. 19, 1909. His description leaves no doubt as to the species. It weighed 32 lbs. Is said to be quite numerous in southern Vermont.[9]

On June 12, 1920, I spent the evening with a number of local hunters at Lake Mashipakong, N. J., and learned on good authority that 2 Lynxes (or "Link," as they called them) were taken in the near woods the previous winter.

In a later paragraph is given John Burroughs's note on a Lynx which he heard in the woods of Roxbury, N. Y., near "Slabsides," in mid-October, 1913.

Numbers and Alleged Migration

I met with but 3 or 4 Lynxes during as many years in Manitoba, so that in the poplar region about Carberry and westward they cannot be called abundant. In the sandhill tract between Carberry and the river, about 20 miles by 15, I doubt if there are ordinarily a dozen Lynxes resident. In the thickly wooded regions northward they are said to be much more plentiful, and in the Peace River country, during the great Rabbit year of 1904, the Lynxes so abounded that nearly every trapper and hunter in the country got from 20 to 50 that season.

That the Lynx population fluctuates greatly is well known to all trappers and fur-traders; but does the species migrate? J. K. McDonald of Winnipeg after 35 years of service in the fur country as a Hudson Bay trader, writes me:

"It is accepted as a matter beyond cavil by all Hudson Bay hunters,

[8] Forest & Stream, Aug. 10, 1907, p. 213.

[9] As above, Oct. 30, 1909, p. 697.

that the Hare, Lynx, and Marten do migrate, and the fluctuation in their numbers is not considered to be caused by epidemics save in the case of the Hare. Were it so with the Lynx, for instance, *their* bodies would surely be found, yet I have not heard of such a thing. It is always the case that when Lynx and Marten are plentiful, so are the Hares, and I am inclined to think that the former is the cause, at least to a large extent, as they are known to destroy the smaller mammals that prey on the Hares. Thus an influx in Lynxes causes such a decrease in other fur-bearing animals that the fur-traders look upon it as a disaster.

"These periodical waves of increase or decrease cover large tracts of country, and it might be found that where in one tract they were moving east, in another they were going west."

George Linklater and Miles Spencer, northern hunters of lifelong experience, reiterate the theory of migration.

The former tells me that at Green Lake, Ont., Lynxes were so plentiful during the winters from 1888 to 1890 that he took in 300 pelts each season at the Hudson Bay post. They then nearly all disappeared, and for 3 winters he took in only 30 to 35 pelts a season. At the same time they appeared in great numbers at Lake Temagaming, 200 miles away, where they had been very scarce, and for some years several hundred pelts were brought in each winter, instead of 20 or 30. At the time of this change he saw many Lynx tracks pointing eastward from Green Lake toward Lake Temagaming, and one day followed a band of half-a-dozen for many miles. They were not hunting, but travelling, and so close together that he could not be sure whether there were 5 or 6 of them. There was plenty of food at both places and no disease among the Lynxes, so it was impossible to say why they went; only he was quite certain that *they did go.*

A great deal of evidence of this sort could be presented. The trappers generally agree that the Lynx is migratory and that it follows the White-rabbit. The Rabbit, however, *does not migrate*, so we may understand this to mean that the Lynxes seek out the regions where the White-rabbit abounds. But an unexpected difficulty arises. If the Lynx population merely shifted, the aggregate fur returns of the entire country would not change, for the trappers cover the whole region every year; yet they do change.

Fluctuations of Numbers

After spending a lifetime as fur-trader, Roderick MacFarlane discusses the question as follows:

"This is one of the principal periodic fur-bearing animals which regularly increase and decrease in numbers about every decade. The experience

of observers, largely corroborated by the Company's London sales, is pretty much as follows: The catch of Lynxes for each, of (say) 3 seasons when they are least numerous, or rather comparatively scarce, fell sometimes as low as 4,000 or 5,000 skins as the entire output for the immense extent of territory covered by the Hudson's Bay Company's business operations. The fourth year would double these quantities, the fifth often more than doubled the fourth, the sixth doubled the fifth, while the seventh almost invariably witnessed the maximum trade of skins. The eighth would still be good, while the ninth and tenth would each exhibit a startling decline in the returns, which in quantity would closely correspond with the sixth and fifth years, respectively, in each decade."[10]

A clear idea of the wax and wane of the Lynx population is found in Alexander Henry's "Journal" on the Upper Red River in the years 1800 to 1808. The old fur-trader thus records the Lynx skins taken in the successive seasons at 20, 67, 194, 167, 38, 0, 4, and 4.[11]

In the section on the "Lynx and His Rabbits" I have given further details of the relationship between the two.

These, then, are the conclusions presented:

First, the Lynx population rises and falls in cycles of about 10 years, and when at its maximum may be as much as tenfold the minimum.

Second, there is no evidence that the decrease is due to epidemic disease.

Third, there is evidence of local migrations, but not of a kind to explain the great changes.

Fourth, after studying the problem on the ground, I feel no doubt that the decrease is due to starvation through failure of the Rabbits; and the story is grimly and silently told by frequent wasted bodies exposed in the woods when springtime melts the snow, as I myself witnessed on the upper waters of the Mackenzie in the summer of 1907.

Fur, Flesh, Etc.

The fur of the Lynx is a staple of Northwestern trade. The number annually exported by the Hudson's Bay Company has long oscillated between 4,000 and 75,000; 1896 was a high-water year, the export being 56,407; 1900 was the low ebb, the number having fallen to 4,473; since then the usual increase has continued, and 1905 must have been near high tide, for in the 1906 sales the Hudson's Bay Company had 58,791 skins. At the previous sale, Lampson's disposed of 21,521 skins, or, in round numbers, 80,000 skins were taken in 1905.

[10] Mamm. N. W. Terr., Proc. U. S. N. M., 1905, pp. 691–92.

[11] Journal, 1897, pp. 184, 198, 221, 245, 259, 281, 422, 440.

Poland's lists, however, show that the other American fur companies collect about 7,000 per annum, with little variation, and that, taking the whole continent, an average of about 30,000 Lynx are killed each year for their fur.[12]

At the London annual fur sales held at C. M. Lampson's in March, 1906, 7,737 Lynx skins were sold. The highest prices realized were 60 shillings ($14.40) each for 4 superb "blue" skins; 30 shillings to 35 shillings ($7.20 to $8.40) were more usual prices for first-class skins, from which they graded down to about 10 shillings ($2.40) for those of third class.

During the season of 1921–22 in Canada, 11,673 Lynx pelts were marketed, according to the Official Report from Ottawa. The average value was $20.38.

The hunters of the Biological Survey[13] report the killing of 30 Lynxes in the cattle country west of the 100th meridian, as against 3,432 Bobcats, showing their comparative numbers in the United States.

Its flesh is a regular article of diet in the Northwest. On the occasion when I tried it, I found it white and well-flavoured, but was debarred—by prejudice, I suppose—from enjoying my meal of Cat.

It is the easiest to catch and kill of any of our fur-bearers, and it is to be hoped that the cruel steel traps will soon be declared illegal for its capture. All justifiable destruction is amply achieved by Dogs, guns, and deadfalls.

Running

The Lynx is a creature of superb activity among matted branches and labyrinthine logs and underbrush. As it rambles through the snowy woods, it usually walks every log it comes to. Sometimes in the midst of a slow walk it will spring forward 12 or 15 feet, apparently without any object other than a wish to see how far it can jump. Yet it is surprisingly slow on the level ground.

The cowboys of New Mexico on their ponies could catch a Bay-lynx in the open within half a mile, even though it had a quarter-mile start. Not only will any common cur Dog overtake a Canada Lynx within a few hundred yards, but even a man who is speedy can run it down in open country, as attested by Alexander Henry. In speaking of Le Bœuf, a famous Indian hunter and runner on the Red River, he says:

"He came in to-day with a Loup-cervier that he had caught in the plains in a fair chase and killed with his small axe; he certainly is an extraor-

[12] Fur-bearing Animals, London, 1892.

[13] Rep., 1918, p. 3.

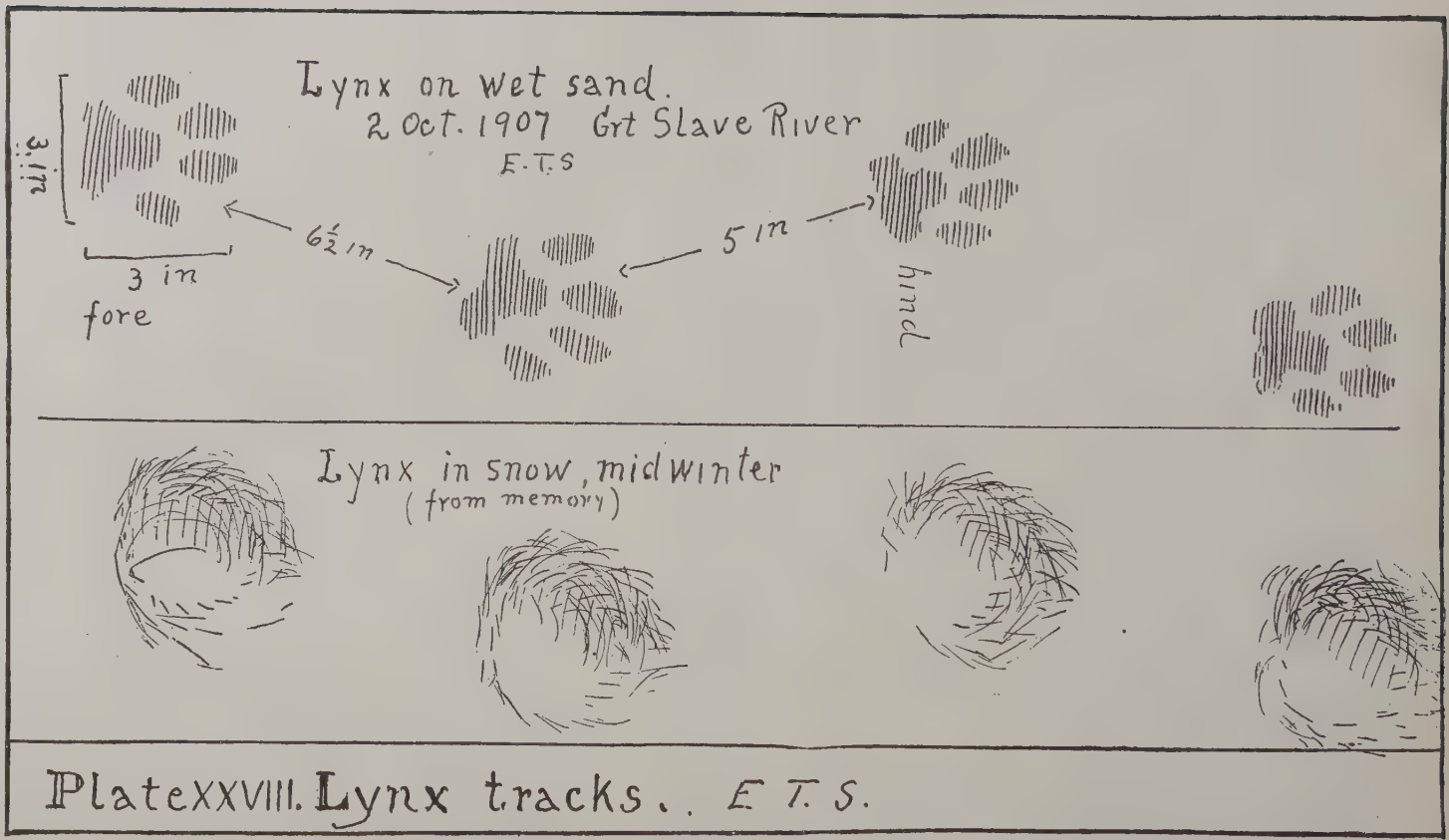

Plate XXVIII. Lynx tracks. E T. S.

dinary runner. He is a tall man, spare and lean, of a mild disposition, but wicked when provoked to anger."[14]

David MacPherson, the Athabaska River pilot, told me that in the summer of 1906 he ran down a Lynx on a prairie of Willow River (Mackenzie), near Providence. It had some 90 yards start; he ran it down in about a mile, then it turned to fight and he shot it.

Other instances have been recorded, and finally, as noted later, I was eyewitness of one of these exploits. Since the creature can be run down on hard ground, it is not surprising to learn that men on snowshoes commonly pursue it successfully. As long as it trots, it is safe, but when it gets alarmed and bounds, it sinks and becomes exhausted. It runs in a circle of about a mile and at last takes to a tree, where it is easily killed. At least one third are taken in this way; it requires half an hour to an hour; there must be soft snow, and the Lynx must be scared so he leaps; then he sinks. If not scared he glides along on his hairy snowshoes, refuses to tree, and escapes in thick woods, where the men cannot follow quickly.

Swimming

The uncatlike readiness of the Lynx to take to water is well known; that it is not wholly at home there is shown by the fact that if one awaits a Lynx at the landing he is making for, he will not turn aside in the least, but come right on to land, fight, and usually perish.

The garrulous and ever-entertaining Henry says, in his Red River Journal, April 22, 1804, p. 242:

"Caught 15 sturgeons and a Loup-cervier; how the latter came into the sturgeon net I cannot say. We saw his track on the beach until he came opposite the net, which completely crossed the river; he appeared to have then taken to the water, for what reason I cannot tell. However, he was found drowned, entangled in the net about 10 feet from shore."

Richardson, in his overland journey, 1848, relates that on June 26, at Buffalo Lake, "a Canada Lynx was seen swimming across a strait, where the distance from shore to shore exceeded a mile. We gave chase and killed it easily. This animal is often seen in the water"[15] and elsewhere he remarks: "It swims well and will cross the arm of a lake two miles wide."[16] I have several times known Lynxes to take to the water without being in any sense driven, and was surprised to find this member of the Cat tribe as good a swimmer as a Dog and far better than a Fox.

[14] Journal, p. 206.

[15] Arctic Search. Exped., 1851, I, p. 106.

[16] F. B. A., 1829, I, p. 101.

While paddling along Athabaska River, Oct. 1, 1907, about 6 P.M., we saw an animal trotting along a sandbar; it proved to be a Lynx. I landed to investigate. It took to the water and swam across to the main shore. In going, it swam about as fast as a Dog; its head and a little of its shoulders were out; it did not seem to go nearly as fast as a Caribou. Its footmarks in the mud did not track right; that is, they were out of register, the hind-foot did not fall in the print of the front-foot, etc. This may have a bearing on its snow-walking habit.

Mating

The species is generally believed to pair, but I have no evidence beyond the opinion of hunters.

The mating season is any time during the first half of March. My Ottawa guide, Ned Crête, of Deux Rivières, tells me that, in 1904, he saw 7 Lynxes together on March 15 or 20. It was the regular running season, and the year before, a similar group was seen at the same place.

There were 2 small and 5 big ones. They were caterwauling like Cats; it was this noise that called his attention to them. Two were fighting exactly like tomcats; the one down on his back had the better of it, being able to scratch with four feet instead of only two.

Murdo McKay of Fort Smith corroborates the account, as he also has seen these cat-like love-makings.

Manly Hardy thinks there is more threat than fight in these mating rows, and says: "I have heard two Lynx using very profane language and telling each other what a fight there was soon to be, but I have never known two to really fight. A half-breed friend told me that once, hearing two swearing at each other, he crept in and saw two Lynx, one of them a very large one, lying on their breasts a few feet apart, with their heads flattened out like domestic Cats when about to fight. A bullet interrupted the story the largest was telling, and that is the nearest I ever knew of two fighting. I have seen where Snowshoe Rabbits had fought like Cats, and have shot them with bites and scratches on their necks. If House-cats fight much, their ears show proof of it. But though I have examined hundreds of Lynx ears, and though Lynx skins are commonly brought in fur side out, so that any signs of fighting would be visible, I have never seen any signs of their having fought."[17]

The hunters generally believe that the Lynx is monogamous, and Miles Spencer gives it as the opinion of the Indians that the Lynx assists the female in rearing the young.[18] Linklater takes the same view and maintains

[17] Forest & Stream, June 29, 1907, p. 1011.

[18] Mammals of Hudson Bay, Low's Rep. Geol. Surv. Can., 1888, App. III, p. 76 J.

PLATE XXV.—THE BIG CAT ON THE GROUND TURNED AND STARED AT ME WITH WILD BUT UNFIERCE EYES
From drawing by E. T. Seton

PLATE XXIX.—YOUNG OF CANADA LYNX (LIFE SIZE)
From drawing on stone by E. T. Seton, made for C. Hart Merriam in 1886

that though the male does not actually accompany the young when they follow the mother, he is always found at no great distance, both in summer and in winter. This same trapper believes that Lynxes travel in families the year round, except in the spring.

Young

The period of carrying is probably 60 to 65 days, since in the common Cat it is 55 to 56 days. This would bring the young into the world about the middle of June in Hudson Bay Territories, but in Pennsylvania, Rhoads says, they arrive in May.[19]

The mother prepares a comfortable nest for them in some hole or hollow log. Whether the father assists in this, I cannot learn. The young are, according to all accounts, from 1 to 3 or 4 in number, but Linklater tells me that he has found up to 6 in the female. This discrepancy I have come across many times, the average number of young in the brood being less than the number of embryos in the female. It may mean that some are still-born, a parallel case being the addled eggs in nests; or, if too many for their food supply, the weak ones die.

When born they are much like the kittens of the House-cat. In 1886 I made a drawing (Plate XXIX) of one to illustrate a paper by Dr. C. Hart Merriam. The specimen was secured by Montague Chamberlain, of St. John, N. B. He says:

"It was dropped on the 20th of March, 1883, when the mother had been in captivity about a month. She gave birth to 5 kittens, but this was the only one rescued from her unmotherly jaws. When the first was born, she at once prepared to clean it, and seemed fond of it. After a short time, however, it gave vent to a weak squeal, which caused her to eye it curiously for a moment, when another squeal was delivered. This settled the kitten's doom—it was at once devoured. The mother did not exhibit any tenderness toward the other 4, and the keeper made two unsuccessful efforts before he was able to get one away from her. This kitten lived two days, and then died from injuires received in its removal from the cage. Its 'mew' was something like that of a domestic kitten, but stronger and harsher; it was almost fierce and very penetrating. The general strength of the animal was greater than that of a domestic kitten. Two hours after birth it stood firmly on its feet and turned around in its box, but it did not show any inclination to fight when teased. The eyes were open at birth."[20]

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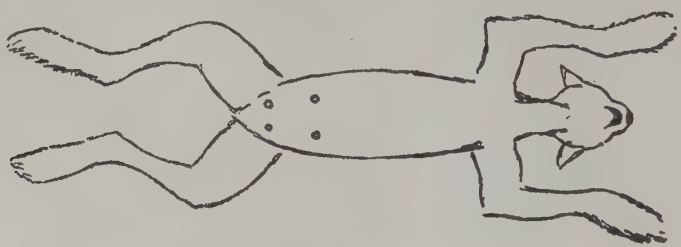
[19] Mamm. Penn. & N. J., p. 140.

[20] Bull. Nat. Hist. Soc., New Brunswick, 1886, no. V, pp. 10–13.

Head of Canada Lynx ♀ in summer. (Half life size.)

Lynx Tails. (Half life size.)

1. Canada Lynx.
2. Bay-lynx.
(Both from Muskoka, Ont.)



Mastology of Canada Lynx ♀.

PLATE XXX—DETAILS OF CANADA LYNX

Miles Spencer states that they are born with closed eyes.[21]

Dr. Merriam adds in his description of the specimen figured:

"It is but a trifle larger than the young of the domestic Cat at birth, and may have been born a little prematurely, though the fact that its eyes were open argues against this supposition. I am unable to give many measurements of value, since I did not see the specimen till after it came from the taxidermist.

. . . . . .

"The ground colour of the body is light fawn, paler below, and inclining to buff on the sides. It is much obscured above by the stripes and rows of concatenating brown blotches, and below by small dark stripes. . . .

. . . . . .

"It is hardly necessary to call attention to the fact that this specimen is one of unusual interest, since its very decided markings, of which scarcely a trace remains in the adult animal, cast some light upon the genetic affinities of the genus to which it pertains. A critical study of these markings leads to the interesting conclusion that the genus *Lynx* was derived from the group of Cats of which the Ocelot (*Felis pardalis*) is the nearest living representative."

Age. In the Washington Zoo, a Canada Lynx, adult on arrival, lived comfortably for 11 years. Another adult, brought there May, 1916, is alive and well now (Nov., 1923). From these we may form some idea of the age to which the species attains.

Family Life

After the young Lynxes have been suckled for 2 or 3 months, the family —mother, kits, and probably father—set out on their travels. A glimpse of their life and adventures at this time is afforded by the following note from my Journal on Athabaska River in 1907: In July, 1906, near Fort McKay, St. Pierre McKay's wife was going around her Rabbit snares and saw an old Lynx staying about. Then she found in the snares a little one held by the neck and dead, and another alive held by the leg. What a family tragedy! Imagine the poor dumb mother, not able to help and not able to go away.

At this time (midsummer) the young are weaned and have for a month or more been eating solid food, but now they begin to learn hunting for themselves. The instinctive habit of the race, stimulated by hunger and the mother's example, is doubtless the prime motive power.

Although usually a shy creature, avoiding a meeting with man, the Lynx mother is very ready to fight for her family.

[21] Mammals of Hudson Bay, Low's Rep. Geol. Surv. Can., 1888, App. III, p. 76 J.

On one occasion, while out on a camera hunt in Colorado, I heard a buck stamping in a little dale and, slipping off my Horse, camera in hand, sneaked after the Deer. I found nothing but his tracks, and was peering across an open place when I caught sight of a large animal close to me on the right. On passing into the clear space it turned to look at me. It was a Lynx, but it seemed very small and its expression was one of innocent curiosity, entirely without menace. It paused at 30 feet. I hastened to adjust the camera, and as I did so a deep rumbling growl and a movement in a thicket close at hand made me jump. I turned around to see within 15 feet a Lynx three times as big as the first, and eyeing me savagely from behind some willows. My first thought was to wish for a gun, for I realized that the Lynx in the open was only a kitten; now I had to meet the mother. My second thought was that the old one would do me no harm if I faced her and did not molest the kitten. So I tried to get her photograph, but she disappeared, and when I looked round the little one also was gone. On this occasion I saw nothing of a second old one, or indeed of any other young ones, for that matter; but they may have been there, as the undergrowth was very thick. The date was Sept. 8th.

The family continues together all autumn. As proof of this, Linklater tells me that in Oct., 1904, he saw 4 Lynxes together hunting at Desbarats; probably they were mother and kits. In 1894, at Green Lake, Ont., he saw 5 together about Christmas; all seemed fully grown. Charles G. D. Roberts informs me that in New Brunswick a band of 5 or 6 Lynxes are sometimes seen in company. All these cases are, I believe, incidents of family life, and the rabbit-drives Nelson tells us of have a similar explanation.

The group may continue together until March comes, bringing with it that great disintegrator of the family band—the mating craze—which prompts the brother and sister to shun each other, and seek each one a helpmate for himself.

Diseases and Sanitation

The Rabbit is the most diseased of our mammals, and the Lynx feeding on the Rabbit should logically inherit the physical troubles of its victim, but I have seen no proof that it does.

As already noted, there is no evidence of epidemics among the wild Lynxes to account for their periodic disappearance.

Those who have the opportunity of conducting *post-mortem* examinations on the bodies of Lynxes can render good service by recording in full their condition, as it is probable that the Lynx may be temporary host of a parasite that finds its final and fatal development in the Rabbit.

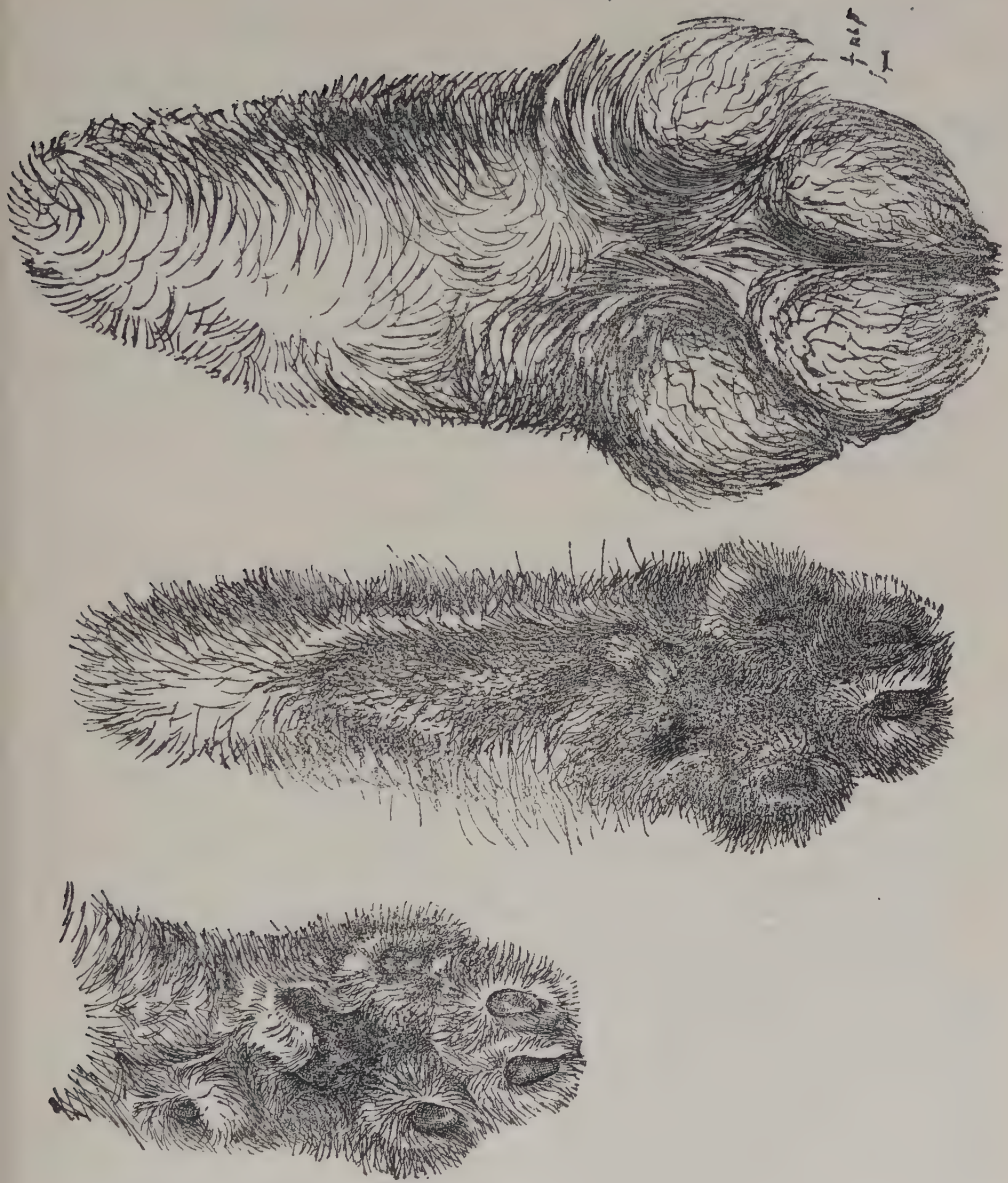


PLATE XXXI—FEET OF CANADA LYNX. (HALF LIFE SIZE)

Uppermost figure, right hind-foot of large male in winter.
Middle, right hind-foot of female in summer.
Lowest, right front-paw of same.

Manly Hardy, after a lifetime of experience among the Lynxes of Maine, writes:

"I am surprised to see that none of our nature writers make any mention of the only reason why Lynx should be feared by man. Lynx are infested by a long, slender, reddish flea peculiar to themselves, and, when carrying one on one's shoulder, the fleas soon think it for their health to change partners. While the change may be a benefit to the fleas, it is not pleasant for those carrying the Lynx."[22]

The specimen from which I made the drawing of feet (Plate XXXI) died of sunstroke in the New York Zoölogical Park.

Like all Cats, the Lynx is scrupulously clean. Menagerie specimens usually set apart one corner of the cage for the cesspool department, and wild Lynxes are said to bury their dung like Cats, but of this I have no conclusive evidence.

Strange Instances

The Wolverine is notorious for its destruction of traps set for other game. Both Wolf and Coyote, as well as Bear and Fisher have been charged with this mischievous propensity, but Manly Hardy, ever to the fore with new light on the wild things, says:

"Lynx rarely trouble log-traps set for Sable or Fisher, but in 1858, while hunting on the head of Little Tobique, in New Brunswick, on the four-mile portage between Spring Lake of Tobique and the upper Nepisiquit, one morning I found the boxing pulled out of several traps. As there was no snow I had no tracks to help tell what had done it, but I found the marks of sharp teeth in the wood, and several white hairs 3 or 4 inches long stuck in the fir balsam of the chips he had pulled out. I was puzzled to tell what animal had any such long white hairs and carefully saved several of them in my wallet to show to my partner. In coming back near night, I found a large Lynx in a Bear trap, and by comparing found that the white hairs came from the muffle under his throat. Fisher and Bear often tear down wooden traps, and I have had a Wolf go out on a dam to get to an island and pull the boxing out of several traps though not touching the bait, but this is the only case in which I knew a Lynx to do it. In no case did this one touch the bait after getting where he could see it."[23]

A very strange affair is thus given by Major Allan Brooks. In the winter of 1908–09, he trapped a large Lynx near Okanagan Lake, B. C., and having killed him, proceeded to remove the beautiful robe.

[22] Forest & Stream, June 29, 1907, p. 1011.

[23] As above, July 27, 1907, p. 131.

"On coming to the head," he says, "I found the skin would not draw over the skull, so, as it was getting late, I left the head to be skinned when I reached camp.

"There a surprise awaited me, as I found a tight-drawn rawhide noose around his neck just back of the head. This was so tight that it seemed it would have been impossible for the animal to swallow, yet it had not impaired his condition nor injured his fur. This noose was the regular two-ply twisted snare used by the Northern Indians, but never to my knowledge used by the Indians anywhere in the region around Okanagan. I showed it to several and they had no knowledge of its use, so this Lynx must have travelled a long distance."[24]

Sociability and Tameness

So far as known, the only approaches to sociability in this animal are the bands of 4 or 5 that are seen together in autumn and winter, and it is the opinion of most hunters that these are the family of the year, still with the mother and occasionally accompanied by the father; so that its sociability is much the same as that of the Wolf.

George Linklater assures me that he has often seen in the snow signs of Lynxes gathered together to chase each other and play at a time when sex instincts were out of the question. But what the nature of the game was, I have failed to learn. E. W. Nelson says: "The fur-traders and Indians of the Upper Yukon claim that the Lynxes sometimes unite in parties of 5 or 6 and make Rabbit drives on the small islands in the Yukon. They claim to have heard the Lynxes utter a sharp whistling noise, and to have found their tracks in the snow where the line had swept the island, until each secured its prey, near the farther end."[25]

Similar testimony is offered by Manly Hardy, who says:

"While usually the Lynx travels alone, or at most with 2 or 3, I have known of two cases where there was quite a large drove of them. In one instance, some men saw a drove near a camp, mostly on trees. On getting a gun, 7 were killed and they thought that more escaped. I saw the skins. All were small. . . . In another case two men were crossing a piece of woods after dark, having a gun and a Dog with them. The Dog treed something, and, on lighting a torch, a large Lynx was shot, and as fast as one was shot, another was treed, which was repeated until 11 were killed. In this case, they were all large old Lynx."[26]

[24] Forest & Stream, Mar. 13, 1909, p. 412.

[25] Alaska, p. 235.

[26] Forest & Stream, June 29, 1907, p. 1011.

Interesting light on the friendly character of the Lynx is afforded by the fact that, when I was in the Far North (1907), Jamie Spencer of the Hudson's Bay Co.'s Fort at Lac la Biche had a tame Lynx which was allowed to run loose, yet even if off in the woods, it always came at call of its name. I did not see it but heard details from my Indian guide, Robillard, who often saw it.

Curious Partnerships

An interesting kind of commensalism has been noted in the Lynx life. Linklater tells me that he has seen a horned owl and a Lynx together working a Rabbit woods, the owl hovering around the outskirts to pick up the Rabbits as the Lynx routed them out. Of course, in this case we must suppose that the owl was a parasite that the Lynx was helping unwittingly. But the same sort of thing is seen with various hawks; nor do they follow only the four-legged hunters, but will impudently try to utilize the terror spread by the gunner, and sometimes, forgetting themselves, come within range, to be added to the common bag.

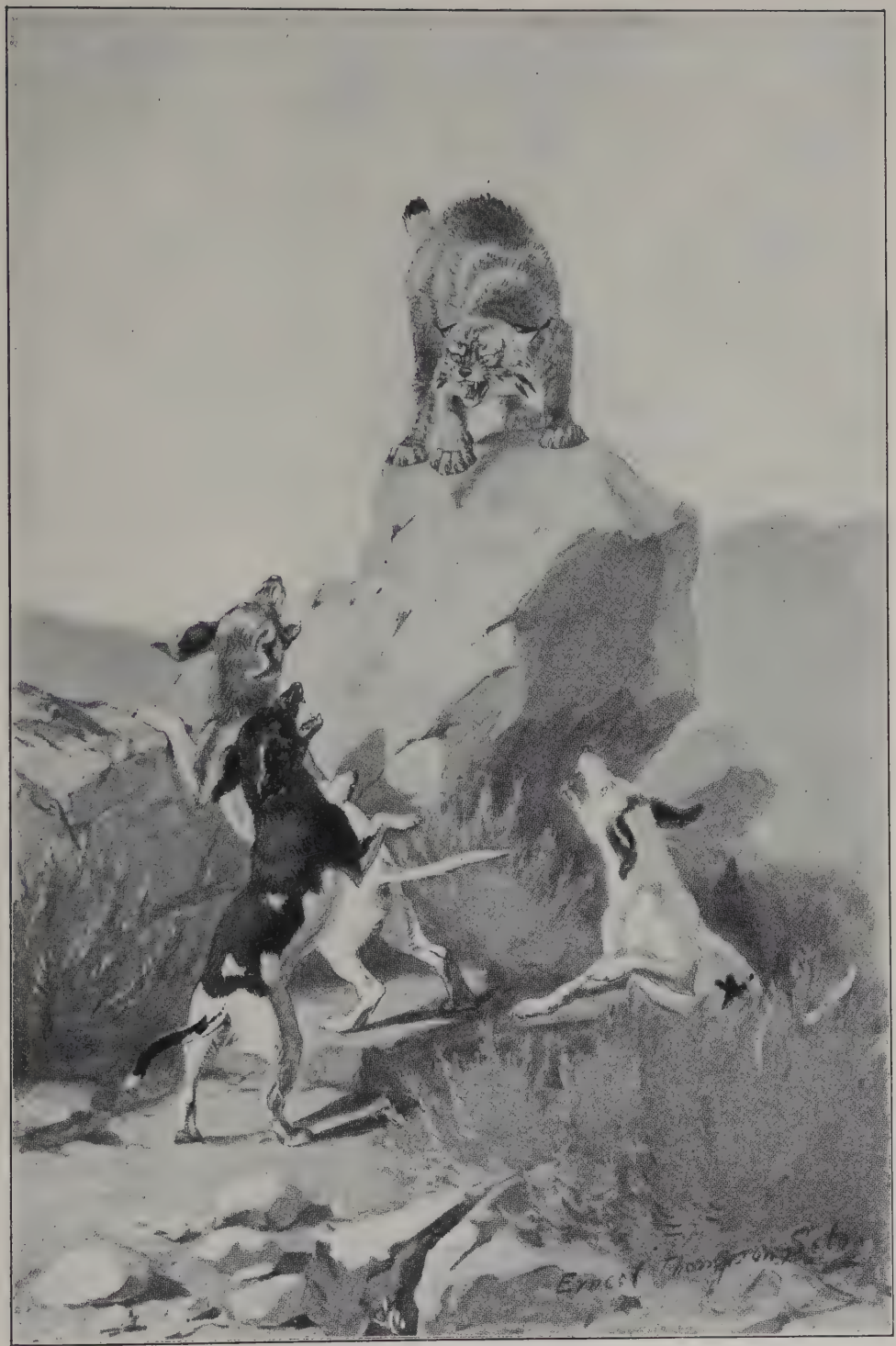


PLATE XXXV.—THE LYNX AT BAY

PLATE XXXIV.—LYNX KILLING FOX

Food: The Lynx and His Rabbits

It is noteworthy that most of our carnivora live chiefly on prey smaller than themselves. The Fox preys on Mice, the Marten on Squirrels, the Badger on Gophers, the Lynx finds its chief support in the White-rabbit.

The importance of the Rabbit to the Lynx is so great that I give the subject a chapter to itself.

Of all the Northern creatures, none are more dependent on the Rabbits than is the Canada Lynx. It lives on Rabbits, follows the Rabbits, thinks Rabbits, tastes like Rabbits, increases with them, and on their failure dies of starvation in the unrabbited woods.

It must have been a Hibernian familiar with the North who said: "A Lynx is nothing but an animated Rabbit anyway."

The Rabbits of the Mackenzie River Valley reached their flood height in the winter of 1903–04. That season, it seems, they actually reached billions.

Late the same winter, the plague appeared, but did not take them at one final swoop. Next winter they were still numerous, but in 1907 there seemed not one Rabbit left alive in the country. All that summer we sought for them and inquired for them. We saw signs of millions in the season gone by; everywhere were acres of saplings barked at the snow-line; the floor of the woods, in all parts visited, was pebbled over with pellets; but *we saw not one Woodrabbit* and heard only a vague report of 3 that an Indian claimed he had seen in a remote part of the region late in the fall.

Then, since the Lynx is the logical apex of a pyramid of Rabbits, it naturally goes down when the Rabbits are removed.

These bobtailed Cats in 1907 were actually starving and ready to enter any kind of a trap or snare that carried a bait. The slaughter of Lynxes in its relation to the Rabbit supply is shown by the Hudson's Bay Company fur returns as follows:

In 1900, number of skins taken	4,473
" 1901, " " " "	5,781
" 1902, " " " "	9,117
" 1903, " " " "	19,267
" 1904, " " " "	36,116
" 1905, " " " "	58,850
" 1906, " " " "	61,388
" 1907, " " " "	36,201
" 1908, " " " "	9,664

Remembering, then, that the last of the Rabbits were wiped out in the winter of 1906–07, the predicament of the Lynxes will be understood.

During that 7 months' journey I met with a dozen Lynxes that were dying of starvation—mere walking skeletons—and in the silent woods found a dozen shrivelled corpses, muffled in the towsled wool that once had been the superb winter coat of a Lynx. There were thousands of starving Lynxes roaming about the country, combing the woods for any last vestige of animal food. Every item of evidence helped to emphasize the dire story of the plague and of the famine that came after.

Some of my 1907 notes are as follows: May 18th, Athabaska River, on roof of a trapper's hut, found the bodies of 30 Lynxes, kept, no doubt, as food for his Dogs, or even for himself in an emergency.

May 19th, Pelican Portage, Athabaska River, young Lynx shot to-day, female, very thin, weighed only 12½ pounds.; should have weighed 25. In its stomach, nothing but the tail of a whitefooted Mouse. Liver somewhat diseased. In its bowels, at least one tapeworm.

June 3rd, Athabaska River, we left this camp of tall timber. As we floated down, we sighted a Lynx on the bank looking contemplatively into the flood. One of the police boys seized a gun and with a charge of No. 6. killed the Lynx. Poor thing, it was in a starving condition, as indeed are most meat-eaters this year in the North. Though a fully grown young male, it weighed but 15 pounds. In its stomach was part of a sparrow (White-throat?) and a piece of rawhide an inch wide and 4 feet long, evidently a portion of a dog-harness picked up somewhere along the river. I wonder what he did with the bells.

June 6th, Upper Slave River, adult female Lynx killed, weighed 15 pounds; stomach contained a Red-squirrel, a Chipmunk, and a Bog-lemming (*Synaptomys borealis*).

June 18th, Fort Smith, young male Lynx, weight 13 pounds, shot by Preble on Smith Landing; had in its stomach a Chipmunk (*borealis*) and 4 small young of the same, apparently a week old, as they were about 2 inches long including the tail. They were naked and rudimentary, but evidently born, as the navel was cleaned off. Only one was crushed. In the stomach were also a score of pinworms. How did it get the Chipmunk family without digging them out? for the Lynx never burrows.

June 26th, on Salt Mountain, west of Fort Smith, found the dried-up body of a Lynx firmly held in a Bear trap.

June 29th, Fort Smith, one of the Jarvis bear-cub skins was destroyed by the Dogs, except a dried-up paw, which he threw out yesterday. This

morning one of the men shot a starving Lynx in camp. Its stomach contained nothing but the Bear paw thrown out last night.

July 27th, Great Slave Lake, found a big gaunt Lynx feeding on the body of another that seemed to have died of starvation.

These are a few of my observations; they reflect the general condition—all were starving. Not one of them had any Rabbit in its stomach; not one had a bellyful; none of the females were bearing young this year.

His Other Foods

In addition to Rabbits, the Lynx preys on various kinds of grouse—is, in fact, the chief enemy of the Canadian grouse or spruce partridge.

It is a curious fact, as I have often witnessed, that the spruce partridge will allow a man to walk within 10 feet and *noose* a number out of a covey, but the moment a Dog or anything suggesting a Lynx appears in the distance, the whole family take flight in alarm. This may be accepted as evidence that the Lynx and perhaps the Fox have for long been the only important enemies of this grouse.

The diet of this animal is thus detailed by Audubon and Bachman: "The food of the Canada Lynx consists of several species of grouse and other birds, the Northern Hare, Gray-rabbit, Chipping-squirrel, and other quadrupeds. It has been mentioned to us that in the territories to the north of the Gulf of St. Lawrence they destroy the Arctic Fox, and make great havoc among the Lemmings (*Georychus*). Hearne informs us[27] that in Hudson Bay they 'seldom leave a place which is frequented by Rabbits till they have killed nearly all of them.' They are said to pounce on the wild goose at its breeding places, and to destroy many Marmots and Spermophiles by lying in wait for them at their burrows."[28]

Manly Hardy relates that his partner was once crossing the foot of a frozen lake as near the open outlet as he dared go when he came on the dead body of a Mink. There was a slight snow, so it was easy to read the story. The Lynx and the Mink had met, by accident no doubt. The Mink had faced the Lynx, which at once killed it by a bite through the neck, dropped it, and passed on.[29]

A. T. Bickford says: "It is hard to say which would be likely to be the aggressor in a conflict between an eagle and a Lynx, but I have seen unmistakable evidence in the snow that these two do engage in mortal combat. By the Lynx tracks and the eagle feathers it was easy to read that in this

[27] Journey, p. 366.

[28] Q. N. A., I, p. 141.

[29] Forest & Stream, July 27, 1907, p. 131.

case the Lynx had come off victorious and had capped the climax by making a meal off his late antagonist."[30]

We shall probably find in its food list every living creature that it can overcome, which means all smaller than itself, not excluding snakes, frogs, and insects. There are probably but two lesser fellow woodsmen that the Lynx lets alone; these are the Skunk and the Porcupine. Starvation, however, may overcome its fear of these, as is shown by Audubon and Bachman: "At a public house in Canada, we were shown the skin of one of these Lynxes, the animal having been found quite helpless and nearly dead in the woods. It appears that, leaping on to a Porcupine, it had caught a Tartar, as its head was greatly inflamed and it was nearly blind. Its mouth was full of the sharp quills of that well-defended animal, which would in a day or two have occasioned its death."[31]

There is one food supply that, so far as I can learn, is never utilized by the Lynx. It never eats fruit, nor, indeed, ekes out in times of stress with any contribution of the vegetable world. When the Rabbits and other game fail, though the woods abound in huckleberries, cranberries, and a dozen other luscious fruits, the Lynx knows them not. It must rustle for flesh meat or die of starvation. In this it is like the Cougar and some others of the Cats.

Storage

Canadian hunters and trappers generally credit the Lynx with a well-developed storage habit. When it secures more food than it needs for the present, it carefully hides it in the earth or in the snow for less bounteous times. One case has already been cited.

How, then, are we to reconcile this provident habit with the direst of famine? The only answer I know is, first, one cannot store food when there is none; second, the famine was so long and dread that all foods, running or stored, were used up, and the nation of Lynx was facing the final penalty of failure to find food.

Death on Foxes

Most persons are surprised to learn that in the thickly wooded country the Lynx is a deadly enemy of the Fox, presenting a new aspect of the ancient feud between Cat and Dog.

One of my guides in the Kippewa region of Quebec (Archie Miller) tells

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[30] Recreation, May, 1902, p. 337.

[31] Q. N. A., I, p. 141.

♀ 26 June
1905
♀ Lynx
6 June
1907
Plate XXXII.
Lynx Studies from Life
by E.T. Seton.
1905-1907

me that in Jan., 1904, as he crossed Askoe Lake near Kippewa, he saw a Lynx and a Fox some 80 yards off, fighting on the snow. He watched them for about 15 minutes. The Fox was trying to get away, but the deep, soft snow was against it, and finally it was overtaken and killed by the Lynx. When Miller came up, the victor ran off into the woods. In the fight, an acre of snow was trampled all over; they must have been at it for an hour. The tracks showed that they began the battle in a woods near by, where there were many Rabbits. The Fox's neck was torn open and its heart pierced in two places, apparently by the claws of its adversary. It was a prime Cross-fox and brought five dollars.

Similarly, Linklater tells me that once when carrying the mails down from Montreal River, Ont., in Jan., 1880, he had halted for noon at the edge of a small lake and saw on the ice, a mile or more away, two animals fighting, one either a Fox or a Fisher, the other a Lynx.

After eating his dinner and resting an hour, he travelled on to the place and found the combatants to be a Cross-fox and a Lynx. They had had a long and desperate encounter, but the Fox, as usual, had succumbed to his foe's superior powers, and had been torn into pieces. The head and tail were lying on the ice, but the body had been carried off and buried under snow in the distant woods, where the traveller found it. The tracks showed that the Lynx had attacked the Fox in the woods and chased him round and round on the Rabbit trails for perhaps an hour before driving him on to the ice, where the killing took place. There were plenty of Rabbits, so that hunger was not the excuse. The Fox was at a disadvantage, as the snow was 3 feet deep and very soft. The Lynx went over the surface on his snowshoes, the Fox ploughed in deep, and the harder he leaped the deeper he sank.

John Bellecourt of Fort Smith related that in the January of 1907, at a place 40 miles south of Smith Landing, he saw in the snow where a Lynx had run down and devoured a Fox.

J. K. McDonald of Winnipeg writes me: "I have known of bodies of even full-grown Foxes being found dead, but uneaten, such having been killed by the Lynx."

From various parts of the great wild North I get the same information. The Lynx is the deadly foe of the Fox and habitually kills it when there is soft snow and scarcity of easier prey. Its broad feet are snowshoes, enabling it to trot over the surface on Reynard's trail. The latter easily runs away at first, but sinking deeply at each bound, its great speed is done in 5 or 6 miles. The Lynx keeps on the same steady trot and finally claims the victim.

Most of the trappers tell of the destruction of Foxes by Lynxes and Fishers.

As soon as these two are trapped out, Foxes increase, but are everywhere scarce in the thick woods.

The latter, however, is not always master of the situation, as proved by the following incident in Nelson's "Alaska," p. 235: "Mr. [L. N.] McQuesten, a fur-trader living at Fort Yukon, witnessed one winter day a combat between a Lynx and a Red-fox, which he described to me as follows: 'The Lynx sprang upon the Fox, in comparatively open ground, evidently trying to capture it for food. The Fox instantly made fight, and for a few moments the fur flew right and left. Then a short pause followed and the fight was renewed. A second pause ensued, and after the two had glared at one another for a few moments, they slowly withdrew in opposite directions, the hair on each bristling defiance, but each apparently satisfied to close accounts.' This Lynx was probably weakened by hunger, for a vigorous Lynx is certainly more than a match for a Fox."

In this case, I suspect further that there was very little snow to give the Lynx his usual advantage.

A contribution by Thomas Anderson, Hudson's Bay Company Factor at Fort Smith, runs thus:

In late March, 1907, an Indian named Amil killed a Caribou near Fort Rae. During his absence a Lynx came along and gorged itself with the meat, then lay down alongside to sleep. A Silver-fox came next; but the Lynx sprang on and killed the Fox. When Amil came back he found the Fox and got a large sum for the skin; one shoulder was torn. He did not see the Lynx but saw the tracks.

The same old-timer is authority for a case in which the tables were turned.

A Desert Indian on the headwaters of the Gatineau went out in the early spring looking for Beaver. At a well-known pond he saw a Lynx crouching on a log, watching the Beaver hole in the ice. The Indian waited. At length a Beaver came up cautiously and crawled out to a near bunch of willows; the Lynx sprang, but the Beaver was well under way and dived into the hole with the Lynx hanging to him. After a time the Indian took a crotched pole and fished about under the ice; at last he found something soft and got it out; it was the Lynx, drowned.

In my early days about Lindsay, Ont., I several times heard of farmers losing lambs or even small Pigs through the attacks of Lynxes; and fawns were believed to be commonly their prey. But the hunters were divided as to whether a Lynx would attack any creature so large as a full-grown Deer.

Deer-killer

One of our best naturalists writes: "We have heard one or two accounts of the Canada Lynx having killed a Deer; we are somewhat sceptical in regard to this being a general habit of the species, although when pressed by hunger, which renders all creatures desperate at times, it may occasionally venture to attack a large animal."[32]

George Linklater claims that he has conclusive evidence in point. At Green Lake, Algoma (H. B. Post), he once found the remains of a Deer on the ice with no tracks but those of one Lynx about it. The Deer was a two-year-old. He is satisfied that it was killed by the Lynx.

Manly Hardy says positively that both Lynx and Bobcat will kill Deer as well as Sheep, and adds that the hunt is a crawl-up and spring, exactly, indeed, as with the Cougar. He says in detail:

"A friend of mine, while following the track of a buck on the first snow, came to a place where he had crossed a part of an open bog to a spruce island. Knowing the habit of Deer to seek such places to lie down, he felt quite sure of his buck till he came to the track of a Lynx which had come in ahead of him and taken the Deer track. Wishing to see if the Lynx had killed the Deer, he followed and, when near the island, saw the Lynx peering out at him from under a low bush. As he thought his chance for getting the Deer was gone, he shot the Lynx, and on following the tracks for a few rods, found the Deer dead. The Lynx had crept to him while lying down, and jumping on his neck, held him down until he killed him by biting his throat. In several other cases where I have known Lynx to kill Deer, they have crept to them and bitten their throats."[33]

J. B. Monroe, of Montana, says:

"On the South Fork of the Flathead I saw where one [Lynx] had killed 4 Deer in the space of a couple of weeks. The snow was deep and I was following his tracks, and came across the carcasses."[34]

Still stronger evidence is offered by L. D. Gilmore, who hunted over one of my old stamping grounds in the Rockies. He writes:

"Early one morning November last [1901] Frank and Charley Allen and A. W. Muckey, all of Dotsero, Colorado, while riding along the old Defiance trail below Dotsero, observed in the snow evidences of a fierce struggle which had continued for some distance down the hillside. Muckey dismounted, followed the course taken by the combatants, and soon came to

[32] Q. N. A., I, p. 141.

[33] Forest & Stream, June 29, 1907, p. 1011.

[34] As above, Aug. 17, 1907, p. 253.

Meat & drink
Plate XXXIIII. Lynx - his meat & drink.

the still warm carcass of a Deer. Leading away from the body were fresh tracks of a Lynx. The beast itself, its repast thus rudely interrupted, was seen, as it sped away, by the Allens, who were still sitting on their Horses on the trail above.

"A day or two later, being in the vicinity and wishing to satisfy myself with regard to a case, which, if true, I believed would be of interest to many, I found the carcass and carefully examined it. Contrary to my expectations there were no marks on the body to indicate that the Deer had been wounded previous to its encounter with the Lynx. Nor is that supposition probable, for no blood could be found in the bed where the Deer had been lying nor along its trail. The only wounds on the body were those made by the Lynx. . . .

"Tracks in the snow told the whole story plainly. The fawn, for such it was, had been lying under a small cedar. Alarmed, presumably by the approach of the horsemen, it had risen and started up the trail. It had gone but a short distance when it came face to face with the Lynx who was coming down the trail. The Deer sprang aside, but too late; the Lynx sprang as well and alighted on the Deer's back. Then began the unequal struggle.

"Either the force of the Lynx's leap knocked the Deer down, owing to the steep declivity, or else it threw itself down to get rid of the brute on its back. Whichever the case, it never rose again; down the hill they went, rolling over and over. But a little way and blood began to stain the snow; a little farther and the snow was crimson; another step, and the track ended in a pool."[35]

This, however, was a fawn, and the evidence was largely circumstantial. It was reserved for young Charles Pokagon, son of Chief Simon Pokagon, of Michigan, to supply the testimony of eyewitness to the successful attack on a full-grown Deer by a Lynx. His story is given thus:

"Several years ago, in January, my father, the late Chief Pokagon, and I were crossing Black River, in this State, with a yoke of Oxen and a sled. We were startled by a strange bleating on shore to the right of us, and at the same time we saw a whirling about in the brush, which at first appeared like a small whirlwind, but in a moment we saw *Suc-se* (a Deer) struggling to free herself from *Bi-su* (a Lynx). Father grabbed from the sled a stake which he used as a war club, and tried to beat the brute off the Deer. *Bi-su* escaped the war club and skulked away out of sight. Our sympathy was awakened for poor *Suc-se* that lay prostrate on the ground, and we raised her up. She was a large doe, but to our surprise, she was dead. We skinned

[35] Recreation, May, 1902, p. 338.

her and found that her throat was severed, and neck mutilated in a frightful manner. We took the skin and saddles home with us, after staking down the remains of the animal, beside which we carefully set a large Bear trap that we happened to have with us.

"The following morning we went back to the battleground. We found *Bi-su* caught, etc."[36]

Reference to the "White Sheep Life" will show that in Alaska the ewes, at least, are sometimes killed by Lynxes. The details are set forth in *Forest & Stream*, March 27, 1909, p. 491. The article describes the killing of 2 nearly adult Alaskan Sheep by Lynxes. It is written by Dr. C. Hart Merriam and Charles Sheldon.

In that Far North where the Lynx grows big and strong and very hungry, where the winter famine is a frightful urge—an urge strong enough to call forth heroic deeds from our mild-eyed simpleton—one is not greatly surprised to learn that the Lynx attacks even the Caribou.

Samuel Hearne states that he once saw a Lynx take possession of a Caribou that an Indian had just slain and "suffered itself to be killed before it would relinquish the prize."[37]

Owen O'Sullivan of the Geological Survey tells me (1910) that he has reliable information of one Lynx killing a bull Caribou in spring on crust. It was seen by Adelard Laveaux, halfway between Quebec and Lake St. John, about 1903.

Bellalise, my Indian guide on Athabaska River (1907), ascribes a similar notable achievement to this animal.

One winter, he says, when hunting Caribou near Fond du Lac, with an Indian named Tenahoo (human tooth), they descried a Lynx sneaking along after some Caribou. The Caribou saw the Lynx coming but had not sense enough to run away. It sprang on the neck of a young buck; the buck bounded away with the Lynx riding, but soon fell dead. The hunters came up; the Lynx ran off. There was little blood and no large wound on the buck; probably its neck was broken. The Indian said the Lynx always kills with its paw, and commonly kills Deer. The river pilot, David MacPherson, corroborates this.

In New Brunswick, according to Charles G. D. Roberts, a band of Lynxes do not hesitate to attack even a Caribou; and George Linklater relates a similar case that he heard of from an Indian whom he considered quite reliable. It was at a point 35 miles north of Sudbury, Ont. The hunter found the place with all the marks in tree and in snow, showing that

[36]Recreation, Sept., 1902, p. 220.

[37]Journey, 1795, p. 372.

the Lynx had been in a tree by the runway and had dropped on a passing Caribou, but the Caribou, by dashing into the thickets, had managed to get rid of its enemy.

From these records we may believe that the Lynx will, if hard pressed, attack Deer and even Caribou, but these are not its usual prey, nor does it care to assail them except when able to do so in force.

However, we have not yet exhausted the list of heroic possibilities in the Lynx when devil-driven by the pinch of an empty belly combined with abundant strength and vigour, for Charles Harding, the Hudson's Bay Company Factor at Fort Resolution, 1907, says the Indians tell him, and he believes it true, that Lynx will kill Moose when they are hard pressed by hunger. They leap on the Moose's back and tear till it falls. David MacPherson also told me that it was well known that on rare occasions Lynx would kill Moose.

A Respecter of Persons

There is one length to which even the urge of hunger and the pride of strength have never yet driven the Lynx—and let this sound a note of comfort to those whose blood is frozen by the demon yells at night about the camp, and whose hair has sat up when, utterly unarmed, they have suddenly found themselves gazing at short range, point-blank into the owl eyes of some Lynx, who, still as a statue, is staring at them from some near log—the Lynx has never yet been known to attack man openly, knowingly, voluntarily.

It may sneak along the hunter's trail after dark, and close behind him, but it seems to be actuated by curiosity more than anything else, and having come near enough to inspect or wind him, is most likely to glide away in search of its proper prey.

I have several times been followed in this way, but usually did not know it till afterward, when I happened to come back again to my old track in the snow.

A hunter told me that he once secured a fine specimen through knowledge of this habit.

Chancing on his track again within a few minutes, he saw the great pad-marks of a Lynx evidently trotting behind him. He crossed an open space into some brush and there sat down to watch. Within 5 minutes, the Lynx came running the trail like a hound and, when within 20 yards, was easily bowled over with a charge of heavy shot.

Several of my companions about Carberry have met with Lynxes among the Sandhills. A dozen times I encountered them in the woods during

my journey in the Far North. In most cases the creature walked away, retiring with great dignity, or, at most, it uttered a deep, defiant growl.

Manly Hardy, after half a century of Lynx experiences, says: "The only case I ever heard of where either a Lynx or a Wild-cat ever really attacked a man, was one my father told me of, when a man wearing a gray coat was following a Deer in a snowstorm through a thicket. The Lynx jumped down from a tree and bit the man's coat on the side."[38] Apparently the Lynx mistook the man for a Deer. Alas! a fatal error for the Lynx in this case.

There is not a year goes by without a new harrowing tale of some brave man's fight for life against a blood-thirsty, ferocious, yellow-eyed Lynx or Wild-cat, but these accounts are whole-cloth yarns without a vestige of foundation in fact, so far as I can learn.

The big-eyed, big-voiced, big-clawed, simple-minded Lynx is, so far as man is concerned, as harmless as any Jackrabbit.

The Appalling Cry

The stripes on the face, the black ear-tufts, the whiskers, and the little, nervous, twitching, black-tipped tail are, no doubt, important direction marks to help the Lynx's own kind in recognizing it, but its voice is its chief means of communicating with its distant fellows. I never heard a Lynx purr, but all other sounds that a House-cat has, the Lynx has, and uses them in much the same way. I know nothing of the "whistling" mentioned by Nelson in a previous paragraph, as a signal from one Lynx to another when hunting.

Manly Hardy, one of the best authorities, says:

"I know that Lynx make four different noises. All these are very much like the noises made by House-cats, only very much louder. They growl when in a trap, just as a Cat does when trapped. Then there is a noise like Cats fighting. This is a horrid noise and can be heard a long way. Then the Lynx, when travelling, seeking a mate, makes a prolonged 'yeouw' just as a House-cat does under similar circumstances. Then they 'mew' like a Cat.

"Once very early one summer morning, while paddling along the shore of a lake toward the outlet, I heard, on a ridge parallel to the lake, a noise 'between a loon's call and a man's halloo,' as the journal of the trip states. It was a noise I had never heard before. We heard it at intervals several times, and thought it must be a man. On getting near the foot of the lake we turned up a stream which ran through low land with high grass on the

[38] Forest & Stream, June 29, 1907, p. 1011.

banks, and I had just left the canoe to see what the chances were of getting over an old Beaver dam, when I was surprised to hear my partner's rifle. I found that he had heard a mew like a Cat, only louder, and on getting on his feet, saw the head of a Lynx some 8 or 10 feet from the ground on a broken-down cedar. He fired and missed. There was then no doubt that it was he [the Lynx] that we heard. He was travelling toward his usual crossing place, when, hearing me, he had climbed this fallen tree to investigate."[39]

This "horrid noise that can be heard a long way" is what I have called the "yowling",and it may be the song of the Lynx, if not strictly its lovesong.

It begins with a long, low "me-ow," followed by others in quick succession, with rising pitch and volume, mixed with "row-row-row's," till, after three or four minutes' continuous performance, the final "me-ows" are terrific screeches. I have heard this in June, November, and December, and do not know what it means or which sex utters it. But the trappers tell me that the somewhat similar and frightful caterwauling of the males is mostly heard early in March and has a direct relation to the mating.

The first time I heard this unearthly, terrifying yowling was in the Mud Creek Ravine near Toronto (now inside the city limits), in the December of 1876. My Dog, a water spaniel, with a big voice and a small heart, at once disgorged his dinner and fled homeward leaving me to face the danger, whatever it was. I was a slim boy, just recovering from a severe illness. I had no weapon, not even a club, and the example of the brave Dog was too much; I turned and ran as fast as I could for home. That Lynx was killed on Cudmore's Hill about a week later.

The last time that I heard it was at Springfield-on-the-Credit, Ont., on June 20, 1888. We were aroused about 11 o'clock at night by the most appalling screaming. The Horses in the pasture galloped about in fright, the roosters crowed, and every Dog in the neighbourhood barked madly. But the soul-racking raving and wailing went on as the Lynx walked calmly across the valley. The yelling continued for about 10 minutes. I went out with a gun, but the Dog was so panic-stricken as to be no help. I saw nothing of the creature.

Some weeks later, two Coon-hunters with Dogs treed a Lynx at a point 3 miles south of my home. One of the men had but one arm, and he was by nature—well, not a brave man. As soon as the light of a torch showed that the creature in the tree was not a Coon but a big Lynx, this man went wild with fear. He flung his one arm around his companion, begging him, in Heaven's name, not to shoot. "For you know what them Catamounts is. If you wound him, he'll jes' lep down and tear us and the Dogs all to pieces."

[39] Forest & Stream, July 27, 1907, p. 131.

Therefore, much against his will, the younger hunter called off the Dogs and they left the Lynx up the tree. So much for the terror inspired by a big voice and bad reputation. If only they had known what a harmless, soft creature the Lynx really is, how easily destroyed with a charge of bird-shot, the story would have been different and there would have been another innocent creature gone, sacrificed to the blood-lust of the white pioneer.

It is to be noted that in none of the cases of the Lynx yelling cited was the animal seen doing it. So far as the description goes, it fits equally well the maniac song of the Cougar, but the probabilities are all against it being the latter.

In 1913, I received word from John Burroughs which showed that he also had been serenaded by a Lynx. The letter is dated Roxbury, Oct. 12, 1913, and reads thus:

"I thought I knew the natural history of my own part of the country pretty well until the other night. I heard a cry that puzzled me. I dare say you can help me out. My neighbours here who have heard the cry tell me it is a Panther, but I don't believe a Panther has been seen or heard here for a hundred years. Here at Woodchuck Lodge, I sleep on the porch. Last Wednesday night, near midnight, I was awakened by a cry or scream in the swamp about 100 yards below me, the like of which I never heard before. It was a cry or scream so loud that I could distinctly hear the echo in the woods about 400 yards away, a cry that tapered off into a long-drawn wail, which for despondency and agony of soul I have never heard equalled. I can find no words suitable to describe its utter hopeless misery and longing. If a lost soul from Hades had been given a few hours freedom but had to be back on the striking of midnight, it might let off such a heartbreaking moan as I heard. It was a shrill, strident cry, ending in this long-drawn wail, full of the feeling of hopeless despair. The cry was repeated 5 or 6 times, then all was still, and presently I heard the clock strike 12. It was a still, hazy, moonlight night. No one else on the porch or in the house heard it.

"The next night a young, recently married couple from Kansas, who were sleeping upstairs, heard the cry twice at the same hour, and the young woman (a college girl) was so frightened that she had to leave her bed and get into that of her husband; and both of them grew so frightened that they could not go to sleep till daylight.

"I thought I could recognize the call or cry of any of the Cat tribe, and I cannot believe that was the cry of the Puma. Have you heard it? This creature was not suffering from pain of body, but from agony of soul. Four young people here heard a similar cry one night 6 years ago, and were about scared out of their wits, and their Horse was greatly scared also."

The Harmless Lynx

It is nearly 20 years since I killed any wild animal, and that was a Lynx. This is the colourless record as it appears in my "Arctic Prairies":

"Athabaska River, May 19, 1907: At night we reached the Indian village of Pelican Portage, and landed by climbing over huge blocks of ice that were piled along the shore. The adult male inhabitants came down to our camp, so that the village was deserted, except for the children and a few women.

"As I walked down the crooked trail along which straggle the cabins, I saw something white in a tree at the far end. Supposing it to be a White-rabbit in a snare, I went near and found, to my surprise, first that it was a dead House-cat, a rare species here; second, under it, eyeing it and me alternately, was a hungry-looking Lynx. I had a camera, but it was near sundown and in the woods, so it was impossible to get a picture. Therefore I went back to the boat and returned with a gun. There was the Lynx still prowling, but now farther from the village. I did not believe he would have harmed the children, but a Lynx is game. I fired, and he fell without a quiver or a gasp. This was the first time I had used a gun in many years, and was the only time on the trip. I felt rather guilty, but the carcass was a godsend to two old Indians who were sickening on a long diet of salt pork, and that Lynx furnished them tender meat for three days afterward, while its skin and skull went to the American Museum."

It sounds all right and clear, but to this day I cannot forget the kitten-like wonder of those big, mild eyes, turned on me as I fired. He fell without a sound, and when I came up, he still gazed without a moan, without a sign of resentment, with nothing but pained surprise, which my conscience translated into: "So this is your love of the wild things."

Three months later on that same journey, I had a Lynx adventure with a very different ending. Here is the entry; also the evidences. (Plate XXXVI.)

We were in the York boat half a mile from Charleston Harbor on Great Slave Lake when one of the Indians said, "Cheesay" (Lynx), and pointed to the south shore. There, on a bare point, a quarter mile away, we saw a large Lynx walking quietly along. Every oar was dropped and every rifle seized, of course, to repeat the same old scene; for these Indians try to kill every living thing they see. Probably it would have made no difference to the Lynx, for the redmen are bad shots with the rifle; but I, the chief, called out a peremptory order: "Hold on there! I'm going after that Cheesay."

Calling my two reliables, Edward A. Preble and Billy Loutit, we set out in the canoe, armed respectively with a shotgun, a club, and a camera.

When we landed, the Lynx was gone. We hastily made a skirmishing line in the wood where the point joined the mainland, but saw no sign of him, so concluded that he must be hiding on the point. Billy took the right shore, Preble the left, I kept the middle. Then we marched toward the point but saw nothing. There were no bushes except a low thicket of spruce, some 20 feet across and 3 or 4 feet high. This was too dense to penetrate standing, so I lay down on my breast and proceeded to crawl in under the low boughs. I had not gone 6 feet before a savage growl warned me back, and there, just ahead, crouched the Lynx. He glared angrily, then rose up, and I saw with a little shock that he had been crouching on the body of another Lynx, eating it. Photography was impossible there, so I took a stick and poked at him; he growled, struck at the stick, but went out, then dashed across the open for the woods. As he went I got photograph No. 1. Now I saw the incredible wonder I had heard of—a good runner can outrun a Lynx. Preble was a sprinter, and before the timber 200 yards off was reached that Lynx was headed and turned; and Preble and Billy were driving him back into my "studio." He made several dashes to escape, but was out-manœuvred and driven on to the far point, where he was really between the devils and the deep sea. Here he faced about at bay, growling furiously, thumping his little bobtail from side to side, and pretending he was going to spring on us. I took photo No. 2 at 25 yards. He certainly did look very fierce, but I thought I knew the creature, as well as the men who were backing me. I retired, put a new film in place, and said:

"Now, Preble, I'm going to walk up to that Lynx and get a close photo. If he jumps for me, and he may, there is nothing can save my beauty but you and that gun."

Preble with characteristic loquacity said, "Go ahead."

Then I stopped and began slowly approaching the desperate creature we held at bay. His eyes were glaring green, his ears were back, his small bobtail kept twitching from side to side, and his growls grew harder and hissier as I neared him. At 15 feet he gathered his legs under him as though for a spring, and I pressed the button, getting No. 3.

Then did the demon of ambition enter into my heart and lead me into peril. That Lynx at bay was starving and desperate. He might spring at me, but I believed that if he did he never would reach me alive. I knew my man—this nerved me—and I said to him: "I'm not satisfied; I want him to fill the finder. Are you ready?"

"Yep."

So I crouched lower and came still nearer, and at 12 feet made No. 4. For some strange reason now the Lynx seemed less angry than he had been.

"He didn't fill the finder; I'll try again," was my next. Then on my knees I crawled up, watching the finder till it was full of Lynx. I glanced at the beast; he was but 8 feet away. I focussed and fired.

And now, oh, wonder! that Lynx no longer seemed annoyed; he had ceased growling and simply looked *bored.*

Seeing it was over, Preble says, "Now where does he go? To the Museum?"

"No, indeed," was the reply. "He surely has earned his keep; turn him loose. It's back to the woods for him." We stood aside; he saw his chance and dashed for the tall timber. As he went I fired the last film, getting No. 6; and so far as I know that Lynx is alive and well and going yet.

His Way of Life

Any one who has gazed into the great, round, sincere eyes of a Lynx that is roaming, unfrightened, in the woods, and noted their look of wonder and simplicity, without a trace of ferocity, will believe at once that this huge fuzzy kitten is the most harmless to man and the easiest to trap of any fur-bearer on this list.

A big, soft simpleton he is with the innocence and mild curiosity of a child, and yet a wonderful gift of keeping himself unseen in the woods, however near he may be to you or your camp.

Manly Hardy, the lynx-eyed Lynx naturalist of Brewer, Me., says:

"It is extremely rare for any one to see either of them [Lynx or Bobcat] unless treed by Dogs or in traps. Those who have not had experience have no idea how seldom one sees any of the land fur-bearing animals in the Maine woods. From a canoe one may often have a chance to see and watch Moose and Deer and occasionally a Bear; also one may frequently see Mink or Otter, and on rare occasions a Beaver; but in the woods it is very seldom that one sees either Fisher, Sable, Lynx, or Wild-cat. As an example of this, my partner and I were once travelling on lines of traps every day except Sunday for 8 weeks. Game of all kinds was fairly abundant, and we trapped some of all kinds, but the only living animals we saw, except when in a canoe, were one Moose, one Porcupine, and a Weasel. And yet we caught 3 Bears in one trap quite near our home camp, and once, in a half day's travel, I took out 8 Sable; my partner, at the same time, in a day's travel, getting 7 Sable, a Fisher, a Beaver, and a Mink.

. . . "Many men have travelled the woods for years and never have seen one. I once was walking in a tote road, with my snowshoes on my rifle, when on turning a bend in the road I saw a large Lynx quite near, standing with his forepaws on the deep snow and his hind-feet in the road. While I was trying to get my rifle clear of the snowshoes, he sprang into the brush, and that is the only fair sight I ever had of one out of a trap."[40]

How largely the Lynx is possessed of curiosity has not been adequately set forth. Robeson L. Low, of Flushing, N. Y., writes:

"A few years ago, when on the northeast coast of Newfoundland, my guide, a half-breed named John Paul, told me he set a trap near the foot of a

[40] Forest & Stream, July 27, 1907, p. 131.

tree and blazed the tree on four sides about 3 feet from the ground, and used no bait whatever. He said that Lynx (Link, he called it) were very curious and would stop to investigate the blazes on the tree.

"The winter before (1903–04) he had completed his round of traps, the last one being in sight from a little eminence, when he sat down to smoke a pipe, as he could see the trap had not been disturbed. As he sat there, a 'Link' appeared on the runway upon which the trap was set. The animal walked up to within about 10 feet of the blazed tree before he noticed the blazes. He immediately sat down on his haunches in the snow and looked at the blaze for several moments, and then got up and approached cautiously and walked completely around the tree several times, drawing nearer and nearer. Eventually he stepped on the trap. John said he jumped straight up in the air and squalled."[41]

A good illustration of the usual meeting with a Lynx is given by Emerson Carney of Morgantown, W. Va., thus:

"A fellow-worker and myself were travelling through the woods in northern Colorado, without axes, hunting for a good 'pole patch' where we could get out a lot of fencing poles. The woods were nice and open, without any underbrush; at the same instant we both saw, about 40 or 50 yards ahead of us, a very large Lynx standing on a log, broad side to us and looking at us. We took a good look at it, expecting every second to see it dash away, for we were sure it saw us. After watching it as long as we cared to, we agreed to start walking slowly toward it. We did so, and to our surprise, after we had approached perhaps 20 steps nearer, it started on its way in the direction it had been going, at right angles with our course, walking slowly and deliberately along the log which it was on, turning its big head occasionally to look at us. Of course, we stopped to watch its movements.

"When it reached the end of the log, it walked in a circular course around us, and all the while getting nearer to us, until it was certainly not more than 20 yards from us, as I can now recall it. It was so close I could distinctly see its big yellowish eyes and the glare which is peculiar to the eyes of the feline family.

"While it did not show the least sign of fear of us, neither did it show any hostile disposition, but just looked at us and moved around us as fearlessly and unconcerned as if we were cattle. As it made no move to leave, I picked up a stone and proposed that I make a sudden dash at it, with a possibility of getting near enough to hit it with the stone, but the instant I made the break for it, it darted off like a flash and was soon safely in a jack pine thicket near by.

[41] Forest & Stream, July 13, 1907, p. 52.

"I have always regretted that I did not keep still and encourage its undue familiarity, just to see how near it would have come, and how it would have acted. Certainly its actions were not due to ignorance on account of youth, for it was a very large one and surely full-grown."[42]

A dozen times I have had a similar experience, and whether we attribute the Lynx's calm to courage or to ignorance, it at least looks like a pleasant wild animal dignity.

This calmness and innocence are even more strongly brought out in the following intimate glimpse of Lynx life and character by "Yo" (George B. Grinnell):

"It must have been 20 years ago that I saw a Lynx, which presumably had never before seen man or Dog, and which displayed before Dogs and a gun an unconcern that greatly astonished me.

"It was late in the fall, and we were camped in a lonely spot in the Rocky Mountains on the shore of a great lake. Six or 8 inches of light snow covered the ground, and this kept us pretty close to camp, while we waited, hoping that some warm days would come and the snow would disappear, so that we might continue our hunting. We had been reasonably successful with the game that we were after, and on an aspen tree close to the tent hung several hams of Goat meat. It was full moon, and this moon shining on the snow made the light almost as bright as day, as the saying is.

"About 2 o'clock one night I was awakened by hearing something fall to the ground, and immediately after, the sound of galloping feet close to the camp. Half asleep, I fancied that one of the Horses had come close to the tent, and perhaps had knocked down the axe or had pushed over a pile of pack saddles, and then becoming frightened, had galloped off. Two little Dogs, however, which were asleep in the snow, began to bark and the sound of the galloping stopped almost at once.

"I got up to look out of the door, and one of my companions did the same. As he looked out, he said: 'Why, something has carried off a ham of meat from the tree', and a moment later added: 'There it is in the brush now.'

"Certainly there was seen in the thin underbrush 25 or 30 yards from the tent door, a dark animal that was evidently eating, for we could hear it tearing at the flesh that it had taken. About this dark object the little Dogs were dancing, barking furiously. We cheered them on, and at length they mustered up courage to rush at the animal, which sprang to meet them and seemed to come down on the back of the largest Dog. This proceeding

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[42] Forest & Stream, July 20, 1907, p. 93.

entirely discouraged the Dogs, which were wholly without training, and both Dogs ran away and disappeared behind the tent.

"My companion reached into the tent for his rifle and fired 3 or 4 shots at the animal, and at the last one it again sprang into the air, and turning, disappeared in the thicker underbrush. My companion walked out to where the creature had been, recovered the meat, brought it back and hung it up in the tree, and we went to bed again. Nobody knew what the animal was, but from its motions it seemed pretty clear that it was a Cat of some kind; perhaps a small Mountain Lion or a large Canada Lynx.

"The next morning while we were cooking breakfast, my companion went out where the meat had been and returned with a little tuft of hair, gray mixed with rufous, which had been knocked away by a rifle ball, and which evidently belonged to a Lynx or a Wild-cat. The small size of the depression in the snow where the animal had crouched, and the lack of any mark of a tail, showed that the animal was not a Mountain Lion.

"After breakfast my friend and I took our rifles and set out on the track to see where the creature had gone. The trail was readily followed and the tracks clearly showed a Canada Lynx. After it had left the meat, it had gone only about 30 steps and then had stopped and lain down in the snow, and in this bed was a drop or two of blood. It seemed clear that it had not been much frightened by the noise of the night before, and it was quite possible that we might overtake it anywhere.

"We followed the trail very carefully through the thick brush, making as little noise as possible, and stopping every few steps to look. We had gone nearly 100 yards when the trail turned suddenly to the right, and my friend, who was ahead, stopped and motioned with his hand. I stooped lower, and looking under his arms, saw the animal not 20 yards distant. It was lying in the sun at the foot of and behind the great spruce tree and only its hips were visible. The underbrush was thick, but to my left there was a little opening through which I cautiously worked my way for several yards under the low-spreading branches of a willow. This exposed the animal's side to the shoulder and I shot it as close to the tree as possible. At the report the animal sprang into view and stretched itself out on the snow, dead. It proved to be a large Canada Lynx, and as it lay there, its thick legs terminating in huge paws armed with long claws gave it a much more ferocious appearance than it was really entitled to.

"An examination of the beast showed that one of the shots of the night before had grazed a foreleg, not penetrating the flesh, but knocking up a little flap of skin; whence the blood that had been found in the bed.

"Here was an animal that had sat around, apparently perfectly un-

concerned, while the Dogs were being set upon it and a number of shots were fired at it from a rifle. In other words, from our point of view, it had displayed courage little short of heroic. No Grizzly-bear, and perhaps no Lion, would have remained undisturbed under such circumstances. But did this mean that the Lynx had courage? I do not think so. The hungry beast had come down from the mountains, found food, and then had been attacked by 2 small animals which it no doubt supposed were trying to take that food from it. Subsequently there had been a series of thunderings, the last one of which had hurt, and so the Lynx retreated. It seemed plain to me that it had never seen a man or a Dog or heard a gun before. These were things entirely out of its experience, and it only learned that some of the things were dangerous when the rifle ball touched its foreleg."[43]

Most trappers have a poor opinion of the Lynx's fighting courage, for it never faces a man to fight with him. Why should it, in view of the odds? And in a trap it is easily killed with a single blow of a club on head or back, which proves only its vulnerability.

True, in hunting a Lynx, a single small Dog is enough to make it take to a tree. This shy retreat before the clamour of Dogs is the habit of nearly every creature of the wilds—Lynx Wolf, Cougar, Leopard, Tiger, and Lion. All have a horror of an uproar, and take refuge up a tree or in some fastness, according to their habit, when assailed by the disgusting annoyance of a loud-yelping Dog or Dogs. I should do the very same myself under the circumstances, yes, even if armed with a repeating rifle and backed by a gun-bearer with a couple more.

But in each case, having taken in the situation, the creature is very ready to turn again and rend the disturber of his peace—will certainly do so unless it is backed by men with guns; brave men who run no risk; fearful guns that are irresistible, that are sure destruction, as the Dogs know just as well as hunters do.

So revile not the Lynx for using the discretionary tactics of war that Lion and Tiger too adopt. And remember that though he may hop up into a tree when assailed by a very noisy and very small Dog, he is very apt, having sized up the situation, to adjust his discretion to his courage, come down, and kill the Dog, unless the hunter be close at hand to succour and support his noisy colleague.

Manly Hardy says: "A Lynx has a long reach and sharp claws, and if backed against anything, can often scratch a Dog of poor courage so that the Dog will leave; but any Dog of 40 or 50 pounds that has any grit can kill any Lynx ever made and not get hurt much.

[43] Forest & Stream, July 6, 1907, p. 13.

"In proof of this, my father once outfitted two hunters who hunted on the Aroostook. Lynx were plentiful that year, and when Father visited them in March they had over 20. A light Dog had killed nearly all of them when in a trap. My father saw him kill several. He would turn tail and back up to the Lynx. When the Lynx jumped on his back, he would wheel and catch the Lynx by the throat; he seldom got scratched in killing one."[44]

Of course not! The Dog was free to choose his time and had the backing of two men armed with guns; while the Lynx was manacled, helpless, and weak from hours of torture and starvation. So this proves little. If these trappers had wanted to see a fair measure of the two animals' merits, they should either have nursed the Lynx back to health and strength and then matched him with a 25-pound Dog, or else have beaten the Dog half to death, broken his leg, chained him to a tree, and starved him for 3 days, so that his preparations would have been the same as those of the Lynx.

The case reminds me of a boy I knew at school—a kindly, simple fellow, who would do most anything to avoid a fight; but once he started, once they crowded him too far, he was a terror. He lost all sense of fear, and few there were to meet him in the ring.

The Lynx is probably in this same class. I discount a hundred tales of Lynxes being cowards, because their courage, being physical, is low when they are bound, starved, and helpless. The very pointed contribution of J. B. Monroe of Montana is that of a man who can ignore stock phrases and see with his own eyes.

He enters a most vigorous protest against the Lynx being called cowardly. He points out that daylight is dazzling and puts the big Cat at the same disadvantage as darkness does a man; also that a Lynx that has been tortured and starved from 24 to 144 hours is hardly in the way of a fair show. He says: "I have seen an old male Lynx put up as game a fight as any animal wrapped up in that amount of skin could be expected to furnish," and relates the following in proof:

"We were hunting Wolves and Coyotes in the Sweet Grass Hills, and had 5 hounds. One of them was a very large brindle stag that would weigh 100 pounds. There were 4 more big half-gray and half-stag hounds, some of them good. Besides there were 5 mongrel Dogs that would attack from behind. This made 10 Dogs in all, or about 650 pounds of as hard-fighting Dog as the most ardent fancier could desire. They would catch and finish a Coyote with a fair start in 5 minutes.

"We found only 2 Gray-wolves on this trip, and one was put into a bad land cave after a few moments' run. Three of these cur Dogs went into

[44] Forest & Stream, June 29, 1907, p. 1011.

that hole, and though finally whipped out by the Wolf, worried it so that my partner crawled in and finished her with a shot. The other was a very large, old, she, gray Buffalo-wolf, and the Dogs did not like to kill her, but they finally did so, after half-an-hour's fighting and the expenditure of much fur. We had no gun and the fight was a running one. Those who attacked her in front were punished badly, as she seemed to take out a chunk of Dog at every opportunity. The curs cut her down behind, and the fight was over soon after we came up and helped with rocks. I mention this to show that these Dogs could and would fight and stay with it.

"One day about 10 o'clock A. M., I was out alone with the pack. The Dogs were fresh and eager. I saw a Lynx prowling along the foothills of the mountains, where there were no trees and no cover. The Dogs had only about 300 yards' run and were in fine condition for a battle. The Lynx saw us, ran about 30 yards to a clump of rose bushes about 1½ feet high and waited for us to open the game.

"The Dogs knocked him over at the first rush, but fighting on his back seemed to be his long suit. You could not have heard it thunder during that row, and the Dogs furnished all the noise. Lying on his back, the Lynx's long legs seemed to saw the air in all directions, and every saw brought a howl and blood.

"Four times did he clear himself of those Dogs, and four times they came back, as I encouraged them to attack. I rode up close, and the Lynx, evidently taking me for a friendly stump, cleared the Dogs—or they, expecting the usual shot sometimes given to save the pack, backed off—and sprang for me. He caught one paw in an old pair of chaps I wore; the other caught the cayuse on the muscle of the fore-leg. A big hound caught him from behind as soon as he struck, and when I had quieted that cayuse, the fight was ended. Every Dog was scratched and cut, mostly under the chin and around the neck on the under side. . . .

"I have often thought that all animals of the Cat kind were badly handicapped in daylight by their eyesight. I have always been careful never to send a Dog on a Lion track late in the evening. I believe all animals of the Cat kind in daylight are somewhat like a man in a dark room.

"On a dark night I should not like to visit a trap that contained a husky Lynx, and in the attempt to bat him with the usual club, merely knock him loose from the trap. I think even a 25-pounder could give a fair account of himself under proper conditions.

"There may be some romance, but I think there is also some fight in a full-grown Lynx. If one of our noted fighting men was caught barehanded in an African jungle by a bull Gorilla armed with a four-foot club, do you

think he would stop to argue the point? Most of us would outrun the Lynx. Yet some people call the Lynx cowardly."[45]

I wonder if I have done justice to my childhood's hero, the Lynx. In those early days, by the big log fire, in the old homestead near Lindsay, Ont., I sat, bug-eyed, while hunters and trappers told the most frightful tales of the powers, the ferocity, the devilish cunning of the Lynx, and I drank them in with horrid joy. I suppose those hunters believed some of those tales themselves.

Later I came to know the fur-traders, to whom the Lynx was a mere article of traffic, a harmless, helpless, contemptible thing, as is the doomed convict to the hangman.

Then I met the Lynx, and was amazed at the shining glory of its yellow eyes, and wondered at its calm, childish gaze, its mildness in the woods. Thus I came to know it better and to know the hunter better—and I understood. How can the hangman comprehend the dying thoughts of his victim? Two kinds he says there are: the violently blasphemous, defiant to the end; and the craven, broken wretch, ready to pawn, barter, or promise anything, everything in Heaven or on earth, for a day of respite. So says the hangman—the trapper.

But there is another kind, a kind more often seen—those that meet the end bravely with unshaken courage and dignity. This is a kind the hangman never sees, because it is not in his low nature to see it. Nevertheless, it is there, it is most often there. I have seen Lynxes done to their death. I never yet saw one that did not meet the end with calmness and fortitude—a fortitude that the hangman miscalled, because he did not understand.

God save us from the hangman!

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[45] Forest & Stream, Aug. 17, 1907, p. 253.

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LIFE VI—THE BOBCAT

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The Bobcat, Bay-lynx, Wild-cat, Red Lynx, Red Bobcat, Tiger Cat, Lynx-cat, or Cat-of-the-Mountain

Lynx rufus (Schreber)

(L. *Lynx*, a Lynx; *rufus*, reddish)

Felis rufa Schreber, 1778, Säugt., III, p. 412.
Lynx rufa Rafinesque, 1817, Am. Mon. Mag., Nov., II, p. 46.

Type Locality—New York State.

French, *Le Chat Sauvage de la Caroline.*[1]
Mexican, *Gato Monte.*
Swedish Settlements on the Delaware, *Kattlo* or *Cat Lynx.*[2]

"Just a big Pussy with a bob-tail" is a childish and, as far as it goes, quite satisfactory description of the Bobcat.

The blazing splendour of its eyes, night or day, and the nervous twitching of its forlorn little bob-tail are the next outstanding features.

From its near kinsman, the Lynx, it is easily distinguished afar, in the narrow strip where they do meet, by its colour and its feet.

The Lynx is of a pale gray tinged with lilac in some lights, and has no dark spots on the upper parts of the body. Its feet look enormous. This is partly due to the great length of the hair, and partly because they are considerably larger than those of its cousin.

The Bobcat is of a soft brown, or reddish brown, with cloudings or spots all over the body; and its feet are small, looking like those of a House-cat, for their fur coat is short and sleek.

When near at hand, the tails offer an easy diagnostic, as in Plate XXX; and further, the Bobcat has a white spot framed in black on the back of the ear; the Lynx has only a dim gray trace of this cat-mark. A like difference is seen in much of their colouration. In the Bobcat, the eye-ring is white, the whiskers spring from black stripes, the feet are blackish on the underside, and the spots on its belly are black. In the Lynx, the eye-ring is dim grayish, the whiskers spring from dark gray spots, the soles of the feet are pale

[1]Buffon: Supplem., III, p. 226.

[2]Rhoads: Mamm. Penn. & N. J., p. 139.

Plate XXXVII. Bobcat sketches

gray, and the spots on its belly are dusky. The ear-tufts on the Lynx are 1½ in. long; in the Bobcat, barely 1 in., and sometimes wanting.

The Bobcat belongs to the Cat family, *Felidæ*, and the genus *Lynx*. In addition to the characteristics of these groups, it is well marked specifically.

Size. A ♂ (Am. Mus. 14367) from the Dismal Swamp, Va., Sept. 3, 1898, measured on the dry skin is: Total length, 34 in. (863 mm.); tail, 5⅜ in. (136 mm.); hind-foot, 6½ in. (165 mm.).

These measurements are small. A ♂ taken at Whitewood, Sask., was: Length, 39 in. (990 mm.); tail, 7 in. (177 mm.); hind-foot, 7 in. (177 mm.).

Colour. The general colour of the above Dismal Swamp male is warm brown, paler and redder on the sides of the head, the legs, and the flanks, with a darker shading down the spine, and all more or less peppered with dusky; chin, throat, breast, inside of legs, and all below, white. The lips are white with the whiskers springing from black spots; the ear is black behind with a large whitish spot on it; there are 2 or 3 brown stripes on each cheek; around each eye is a white ring; the legs are thickly spotted with brown dots outside and with a few large blackish spots on the inside. The flank is brown-spotted, and the belly, black-spotted. The soles of the feet are dusky.

The tail is white below and of the back-colour above, with a big black spot on top near the tip, and 3 or 4 blackish spots or bars on the tip half of the tail. Sometimes these lesser tail-spots form faint bars. This represents the late summer and darkest coat; the winter coat is paler, though more tinged with rufous and with the spots obscured. There is no obvious difference in colour between the sexes.

Weight. Bachman gives the weight of a fine adult ♂ at 17 lbs.,[3] and says the ♀'s are smaller.[4] Probably he referred to Carolina specimens. Two ♂'s taken in Ontario are recorded in my Journal at 24 lbs. each. Allan Brooks says that the Plateau Wild-cats of British Columbia range from 15 to 20 lbs., a large ♂ weighing 25 lbs.[5]

In New Mexico (near Clayton) I got fall specimens as follows: ♂, 23 lbs.; ♂, 22½ lbs.; ♀, 20½ lbs.

In Maine, Manly Hardy says: "Our Wild-cats weigh nearly like Lynx, if anything a trifle heavier."[6]

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[3] Q. N. A., I, p. 5.

[4] As above, p. 4.

[5] Recreation, Sept., 1902, p. 174.

[6] Forest & Stream, June 29, 1907, p. 1010.

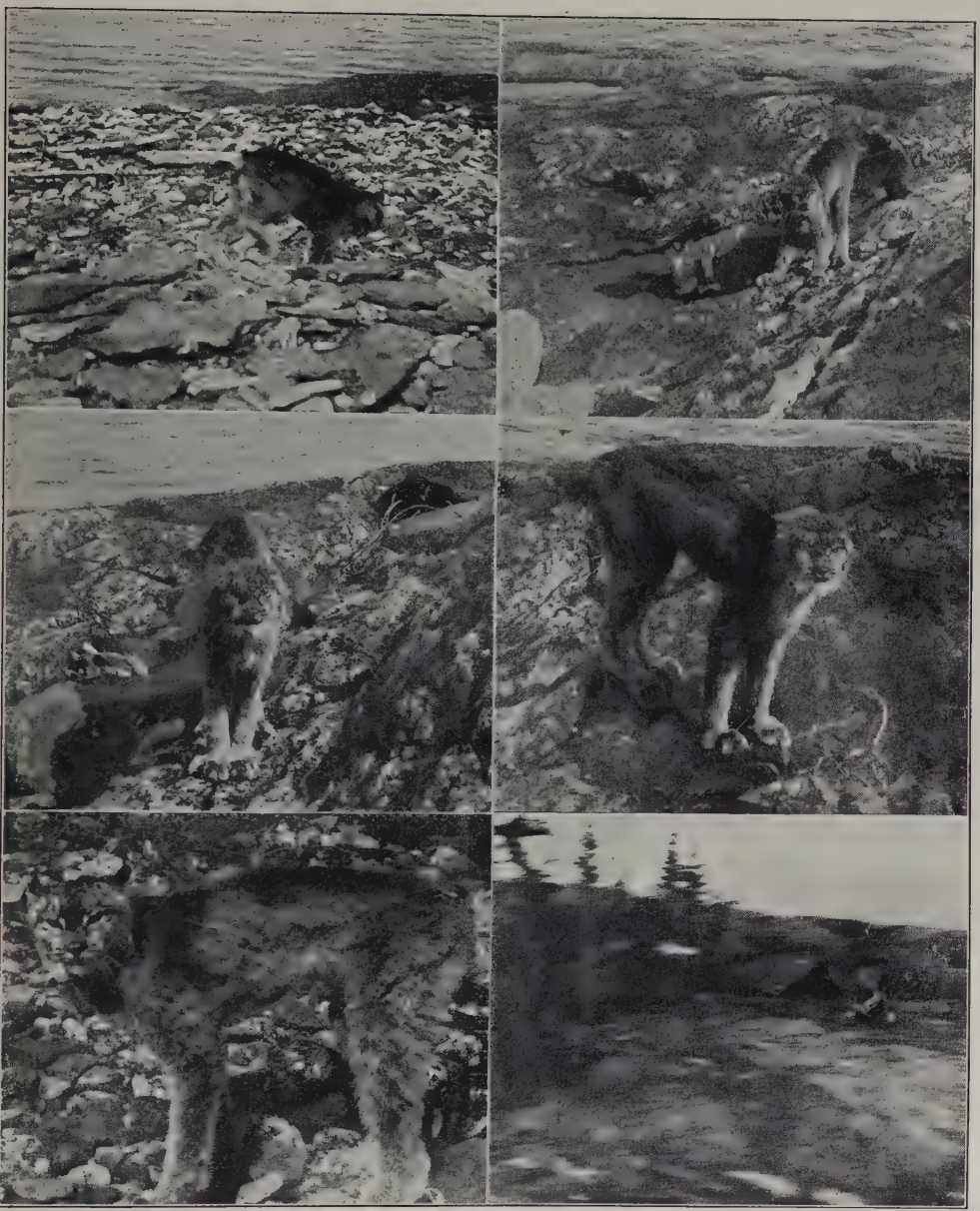


PLATE XXXVI.—THE LYNX THAT WAS CORNERED AND MADE TO POSE
Photographs by E. T. Seton, July, 1907

Plate XLI. Bobcats (uinta)-Poses
Photos by E.T.Seton

The type specimen of *uinta*, a ♂ taken by Bailey at Bridger's Pass Wyo., weighed 31½ lbs.[7]

At the National Zoo, Washington, D. C., 3 Bobcats were received from Wardo, S. Dak., on Jan. 15, 1912. They were 2 ♂'s and 1 ♀ and weighed respectively 28¼ lbs., 32¾ lbs., and 39¾ lbs. Thus this ♀ has the record weight for the species.

From this we have a good idea of a Wild-cat's weight; and when hunters tell of a "65-lb. Wild-cat" that they have secured, we may rest assured that the weight was an enthusiastic hunter's *guess*, quite untrammelled by the help of scientific instruments.

Races

The following races of Wild-cats have been recognized:

rufus Schreber, a middle-sized reddish animal. T. l., New York State.

texensis Allen, a deep-coloured, much-spotted race. T. l., "Mexico."

californicus Mearns, like *texensis*, but browner and less spotted. T. l., San Diego.

eremicus Mearns, a pale grayish animal. T. l., New River, near Laguna Station, Colo. Desert, Imperial County, Calif.

escuinapæ Allen, like *californicus*, but smaller, with short coarse hair, more rufous in colour, with abundance of black spots and streaks on back, and soles not black. According to Dr. J. A. Allen, this creature appears in two colour phases, red and gray. T. l., Escuinapa, Mex.

floridanus Rafinesque, a small dark form. T. l., Florida.

peninsularis Thomas, like *californicus*, but very small with much smaller skull. T. l., Santa Anita, Lower Calif.

fasciatus Rafinesque, a West Coast form; it is richly coloured, chestnut and bay, and conspicuously spotted with black on the under parts. T. l., "N. W. Coast," probably near the mouth of Columbia River.

pallescens Merriam, like *fasciatus*, but smaller and grayer. T. l., south side of Mount Adams, near Trout Lake, Skamania County, Wash.

oculeus Bangs, like *fasciatus*, but dusky on the back, and lacking the red tinge. T. l., Nicasio, Marin County, Calif.

baileyi Merriam, a large animal, very pale, with short tail; its back

[7] See Wild Anim. Glacier Nat. Park, 1918, p. 82.

coloured like that of Canada Lynx. T. l., Moccasin Spring, Coconino County, Ariz.

uinta Merriam, large and gray, like *baileyi*, but darker. T. l., Bridger's Pass, Carbon County, Wyo., 18 miles southwest of Rawlins.

gigas Bangs, a very large, dark form, confined to Nova Scotia. T. l., 15 miles back of Bear River, N. S.

Range, with Map

The Bay-lynx of books, the Bobcat of hunters and trappers, is distributed throughout the transition or southern temperate zone of North America, from sea to sea.

It will be noted that its distribution is much like that of the Whitetail Deer, the Big Skunks, and one or two others, and each of these develops a race that reflects the environment of each new area that it enters.

Whether these are subspecies, that is, species in the making, or full species, which means finished product, with hallmarks differing from those carried in the next faunal area, is not in my province to determine. I accept the ruling of the latest accredited skull-man as probably safest, and focus my attention on the life-history—the little mind and how far it has got. How many minds has the Bobcat? It seems wisest here to be conservative and save space by treating the Bobcat mind as one—the one big over-soul of the group. It may have evolved new habits in its widespread range, but I have met with the creature from Florida to Montana and south to Texas, and I cannot discover any difference in mentality or methods other than are imposed by different surroundings, so that taken by and large, there is but one Bobcat from the life-history viewpoint, with the inevitable disturbing factor of individual variations cropping up with pertinacity, unexpectedness, and force, when we try to frame some hard-and-fast rule.

The range of the Banded-Bay-Lynx-Bob-Wild-cat affords some interesting peculiarities.

Beginning at the extreme east, we find that during primitive times in Nova Scotia "the Wild-cat is more abundant [in Acadia] than the former animal [Canada Lynx] and is nearly of the same size."[8] This, of course, is the form *gigas*.

Leith Adams entirely omits it from his very complete "List of Mammals of New Brunswick" (1873), and Manly Hardy mentions as noteworthy that he, "when in St. Johns, N. B., some 40 years ago, was told that 3 had

[8] Campbell Hardy: Sporting Adventures in the New World, 1855, vol. I, p. 54.

MAP VII. RANGE OF THE BOBCAT OR BAY-LYNX

By E. T. Seton, with assistance of the Biological Survey, 1920

The dotted line on the north shows the recent extension of the Bobcat in the wake of settlement. The black spots are definite records noted later.

been killed in King's Square and the graveyard the previous winter."[9] These were probably newly arriving immigrants who got bewildered and lost in town before they had their bearings and locations.

In the same article, Hardy, implying that the species is rare in Maine, says: "I have known several killed in the heart of Bangor."[10]

In Vermont, according to Zadok Thompson: "This animal has been frequently met with in our woods, and has perhaps been most generally known by the name of Wild-cat. . . . This animal is now very rare, being only occasionally seen in the most unsettled parts of the State.[11]

P. H. Gosse does not mention the species in his "Mammals of the Sherbrooke Region of Quebec" (1840).

Merriam says: "The Wild-cat is, for some reason, an extremely rare animal in the Adirondacks. It may be that our climate is too severe for it, since it is much more common farther south."[12]

Yet in 1886, I saw several skins that were taken near Lake Nipissing, and have seen recent Ontario specimens from the following localities: Baxter, Simcoe County; Kettle Point, Lake Huron; and Grand Bend, S. E. corner of L. Huron, although Anthony Gapper does not include the species in his Lake Simcoe list.[13]

In Michigan, according to Norman A. Wood, it is generally distributed, ranging over both Upper and Lower Peninsulas, up to Lake Superior.[14]

About Duluth, Minn., I found it quite abundant, although the Canada Lynx is rare.

It does not appear in any of the early lists representing the fauna along the International Boundary. A. Henry, H. Y. Hind, Dr. C. E. McChesney, and E. Coues omit it altogether; and Jonathan Carver describes it as a creature of the interior parts of North America, but gives no exact locality, though he was evidently describing the Minnesota and Dakota region.[15]

In my young days (1882–87) it was unknown in Manitoba. But evidently it is following the farmers, for in June, 1914, E. W. Darbey, the taxidermist of Winnipeg, credibly assured me that it is now common about Larivière and Pembina, in south Manitoba.

In 1910 Alexander Calder of Winnipeg showed me a fine specimen of

[9] Forest & Stream, Jan. 29, 1907, p. 1010.

[10] As above, p. 1010.

[11] Nat. Hist. Vermont, 1842, p. 37.

[12] Mamm. Ad., p. 41.

[13] Zoöl. Journ., 1832, p. 203.

[14] Check List, Mich. Mamm., Univ. Mich., 1914, p. 8.

[15] Travels, 1796, p. 297.

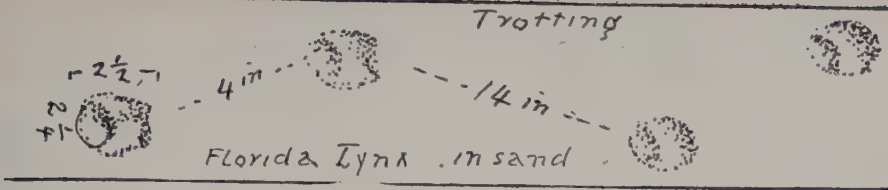
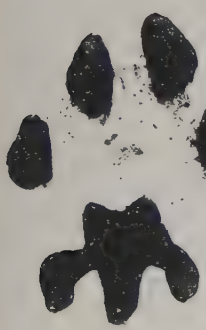


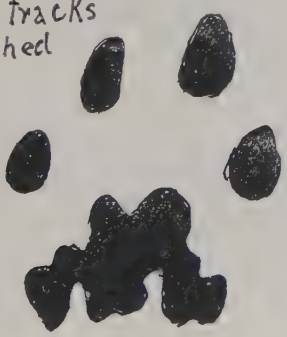
Plate XXXVIII. T. Lynx.
ink tracks
on paper
24 Mar. 1902 E.T.S

Tracks of Texan Lynx
(untouched.)



Texan Lynx ⅓

black tracks retouched



Bobcat that was taken at Whitewood, Sask., just west of Russell, Man., about 4 years before.

V. Bailey says it was numerous in Dawson County, Montana, 1887.[16]

In May, 1914, at Banff Museum, I was shown a Bobcat recently killed at Devil's Head, 40 miles due east of Banff, and was assured that they are found all along the foothills up to that point but no farther northward.

In British Columbia, Allan Brooks fixes Shuswap Lake as the northern limit.[17]

So far as I can determine it, I have indicated the northern limit in primitive times by the tint and the modern farther-reaching range by the dotted line; for we find a change that seems to prove the furtive Bay-lynx of a kind that thrives with the new opportunities of partial settlement, in spite of the new dangers.

Haunts

While this animal, like most of the family, is a creature of dense cover and rough, rocky hillsides, there is a marked difference between its chosen home surroundings and those of the Canada Lynx. The Lynx is essentially an animal of primitive evergreen woods; the Bobcat prefers broken woods varied with precipitous cliffs, sunlit glades, hardwood timber, and swamps. Otherwise expressed, the Lynx is a Cat of the big timber and a Canadian climate; the Bobcat is a Cat of the little timber and a United States climate.

According to Manly Hardy, these two differ widely in their choice of home surroundings. "The Lynx," he says, "inhabits the deep woods, while the Wild-cat lives mostly near the settlements, and probably the great majority of the Wild-cats now in Maine are not 5 miles from some house."[18]

In Dixieland, this animal abounds in the great canebrakes or swamps that are a characteristic border of the rivers and lagoons, especially in the lower Mississippi Valley.

Bachman says it "frequents the thickets that generally spring up on deserted cotton plantations, some of which are 2 or 3 miles long, and perhaps a mile wide, and afford, from the quantity of briers, shrubs, and young trees of various kinds, which have overgrown them, excellent cover for many quadrupeds and birds."[19]

[16] Rep. Orn. & Mamm., U. S. Dept. Agr., 1887, p. 432.

[17] Recreation, Sept., 1902, p. 174.

[18] Forest & Stream, July 27, 1907, p. 131.

[19] Q. N. A., I, p. 6.

Bailey's description of its Texas home surroundings is particularly happy and strong in local colour.

"The country occupied by this Plateau Wild-cat," he says, "is mainly open, arid, and rocky. Canyons, gulches, and cliffs are its favourite haunts and hunting grounds, while caves and clefts in the rocks furnish dens and safe retreats from which hunting excursions are made into the valleys and even to the edge of the plains. Fresh tracks are frequently seen where the Cats have followed the lines of the cliffs, crept along narrow shelves of rock from one Wood-rat's den to another, or walked noiselessly in the dust, under and around the great boulders and broken talus at the base of a cliff where the Cottontails hide."[20]

In Florida, I found its tracks and signs of general distribution in every palmetto stretch.

In the Rockies the Lynx was the creature of the dense pine forests with the Bobcat his near neighbour here, but theoretically not overlapping his territory.

To sum up these various testimonies, the Lynx is a thing of the primitive forests, and retreats as they fall, just as do the Marten, the Fisher, and the Wolf. The Bobcat is a lover of the half-open country, and having learned many clever tricks by which he can avoid the evil beast that makes the clearings and that is better known as Man, he follows the advance of said evil beast and preys on its resources, with skill and success until the clearing process is pushed overfar; then the Bobcat succumbs. But at present he is, like the Fox, the Coon, the Possum, and the Woodchuck, one of those talented creatures that expand their range with the onward march of the settler (see map).

Numbers

The compiled reports show that, though the Bobcat has become greatly reduced in the northeastern States, it holds its own with little diminution in the south, southwest, and the Rocky Mountain region.

In Maine it is not uncommon now, but Manly Hardy says that about 1860 it was more abundant than it has ever been since; apparently there was at that time a sort of invasion of Wild-cats.[21]

According to Rhoads (1903), the Wild-cat is exterminated in only 13 of the 67 counties of Pennsylvania,[22] and since the removal of the head-money, it is actually increasing again. Henry W. Shoemaker records the

[20] Texas, p. 170.

[21] Forest & Stream, July 27, 1907, p. 132.

[22] Mamm. Penn. & N. J., p. 141.

names of a dozen hunters who have killed over 500, and George Smith of Elk County, who killed 500 Catamounts and 600 Wild-cats.[23]

In New York State, according to Merriam,[24] it is often quite common even in thickly settled localities.

In Massachusetts it is still found, though rare and confined to the wooded and hilly section of the west.

According to an editorial in the Natural History section of *Forest & Stream*, Feb. 20, 1909, p. 291, $5 bounties have been paid for Wild-cats killed in Berkshire County, Mass., as follows: 20 in 1903, 22 in 1904, 23 in 1905, 20 in 1906, 12 in 1907. It is possible that some of them were Canada Lynx, but most likely all were Bobcats.

In Ontario it is still to be found south of the Ottawa, though not common.

In northern Michigan it is common.[25]

In Dixieland it is generally distributed and common, though reduced in numbers.

In Alabama it occurs in moderate numbers.[26]

In Florida it is generally distributed and common to-day.

According to the report of Game Warden Bryan of East Baton Rouge Parish, Louisiana, the last year the game bag of his territory included 55 Wild-cats.[27]

In Texas, according to Bailey, 1905: "It is common over southern and eastern Texas and especially abundant in the dense chaparral of cactus and mesquite along bushy stream bottoms, and in the timbered gulches where the lower arm of the Staked Plains breaks down into the low country, and in the swamp country farther east. At Port Lavaca, Oberholser reports 'The Wild-cats are common in places away from town where there is sufficient cover, such as live-oak thickets and the great rose hedges. In the thickets they are not so difficult to hunt, but in the hedges they have almost impenetrable cover, and it is well-nigh impossible to reach them except by trapping.' He says that at O'Connorport 'a good many Wild-cats inhabit the thicker part of the oak brush, where they can be hunted only with Dogs'; on Matagorda Island 'they occur in the little chaparral that grows on the island'; and at Beeville 'they are common in the denser portions of the chaparral, where specimens are frequently secured not far from town.'

[23] Penn. Wildcats, 1916, pp. 28–29.

[24] Mamm. Ad., p. 41.

[25] C. C. Adams, 1905, Ecol. of N. Mich., p. 131.

[26] Howell: N. A. F., no. 45, 1921, p. 42.

[27] Forest & Stream, July 10, 1909, p. 56.

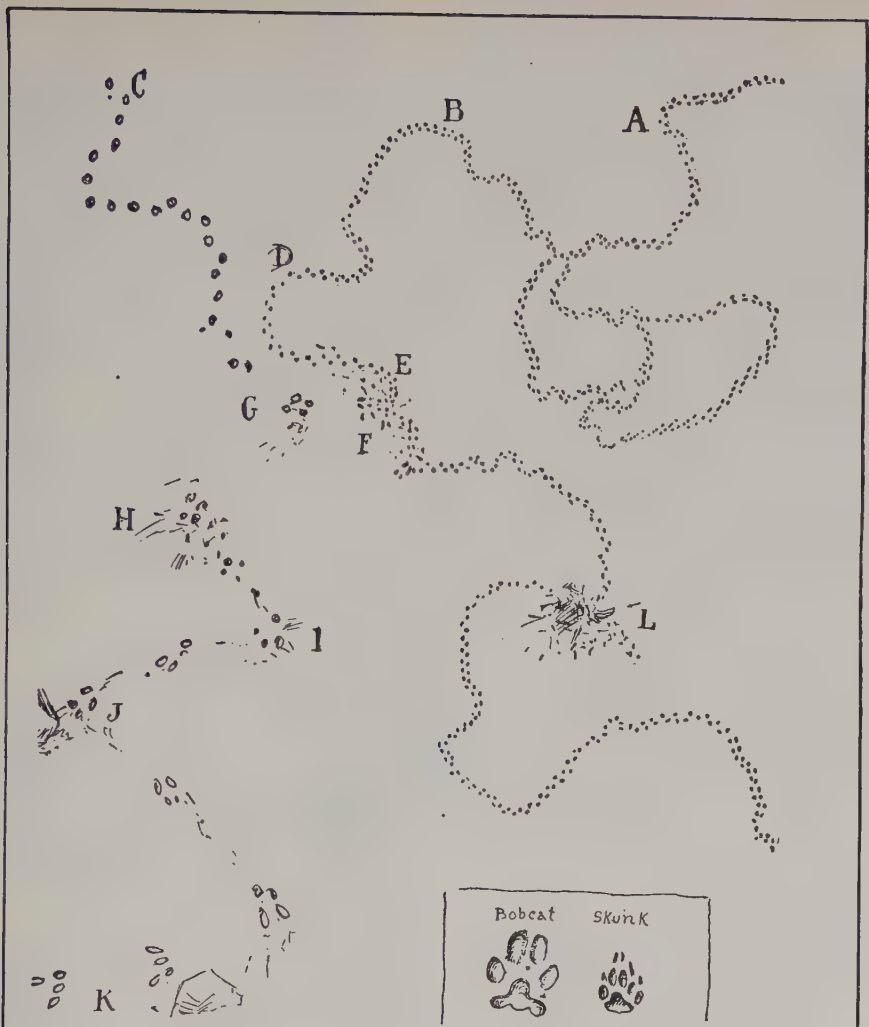


PLATE XXXIX—Track Record of a Fight between a Skunk and a Bobcat. They met at G. E. F. The defeated Bobcat fled toward K New Mexico, Nov., 1893.

From Corpus Christi to Brownsville, in 1900, Wild-cats were common along streams and in the chaparral, where their tracks were abundant in the dusty trails and on the muddy margins of streams and pools, but where the cover was generally too dense and thorny to admit Dogs or to allow any method of hunting save by traps or poison. . . . Common at Uvalde, Devil's River, Kerr County, and farther east at Seguin, but in no other locality so abundant as in the Big Thicket of Liberty and Hardin counties."[28]

In 1920 I found it common in eastern Arkansas. In 1892 it was quite common among the brakes of northern New Mexico, and in 1912 I found it somewhat general in the cover country north of the Yellowstone Park.

The Biological Survey reports that for the year ending June 30, 1918, its agents have destroyed 3,432 Bobcats and 30 Lynxes. These were chiefly from the Rocky Mountain region and the far Southwest.[29]

In California it holds out well. Stephens reports it common in 1906.[30] "The Wild-cat (*eremicus*) is still found in numbers here as indicated by the number being trapped in the Monterey district of the Santa Barbara National Forest."[31] And Nelson says that "one winter, some boys with Dogs killed more than 80 Bobcats" at a mountain ranch in the redwood forest south of San Francisco.[32]

Its Success. While still abundant in Dixieland, Florida, Texas, and California, which may mean nearly holding its own, we have the delightful assurance of Rhoads that it is increasing in several counties of Pennsylvania, following the deforesting of sundry large districts; thus it takes advantage of the half-open woods so much to its taste.[33]

So also Manly Hardy testifies to its increase with the opening up of the Maine hinterland,[34] and in Manitoba it has not only increased with settlement, but has come in and spread over vast areas where formerly it was quite unknown.

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[28] Texas, pp. 169–70.

[29] Rep. Biol. Surv., Aug. 29, 1918, p. 3.

[30] Cal. Mamm., p. 210.

[31] H. H. Hunt., Cal. F. & G., Jan., 1902, p. 37.

[32] W. A. N. A., p. 412.

[33] Mamm. Penn. & N. J., p. 140.

[34] Forest & Stream, July 27, 1907, p. 131.

Home Range

At present I have no material to prove the size of a Wild-cat's home range. Probabilities and analogy would show it to be not more than a thousand acres in regions where food was plentiful, but larger in a starved land. Indeed, it has been known to go a-hunting as far as 5 miles from home.

In a richly provided dense cover of a small area, a Wild-cat will settle down comfortably, feeding contentedly on his tenantry, and never venturing farther afield than he has to, except, perhaps, when for reasons well understood, he goes, in the breeding season, gallivanting fast and far, nor ceases his travels till he finds what he went after.

Den

The den of a Wild-cat is at times under an old log, under a slashing, or in a thicket of vines, but the favourite place is in a standing hollow tree, sometimes with the opening 20 or 30 feet up, but generally much nearer the bottom, frequently in a cavity at the root, and occasionally in a hollow log lying on the ground. The nest is always lined comfortably with a pile of dried leaves and soft moss.

Sanitation

A pair of Uinta Bobcats that I kept in my menagerie for over a year were very careful about their sanitation—at least, I suppose they thought so; for regularly, after their morning drink, they turned about and carefully dropped their excretes in the water trough. In the cage this was, of course, unclean, but in natural surroundings would have been quite correct, for our engineers assure us that sufficient dilution amounts to disinfection. The principle is clearly recognized in a mosaic ordinance. After listing a vast number of things as unclean, and stating that any of these, falling into a drinking vessel, pollute it with its contents so both must be destroyed, the great Law-giver adds: "Nevertheless, a fountain or pit wherein there is plenty of water shall be clean."[35]

Arthur F. Rice gave me this interesting note on the sanitary habit of the big Nova Scotia Wild-cat. There is near Digby, N. S., a long glacial dump.

[35] Leviticus, XI, 36.

On this are a great many ant-hills, and on every ant-hill a Wild-cat has left a pile of its excretes.

Mating and Young

The mating of the Wild-cat apparently takes place during late February or early March in the northern part of its range, and about a month earlier in Dixieland. But there are no definite observations available to fix the date.

In the common House-cat, gestation lasts 55 or 56 days; in the Cougar 91 to 97 days; the Canada Lynx is said to go about 90 days. Since there is usually a relation between the size of the animal and the length of gestation, we are safe in assuming the bearing period in the Wild-cat to be *about* 70 days.

The young vary from 2 to 4, but generally are 3 in number. As usual in this family, they are small, blind, and helpless at birth.

Bachman says that his friend, Dr. Samuel Wilson of Charlestown, contributes this note: "April 15, 1839, shot a female Wild-cat as it started from its bed, out of which 4 young ones were taken; their eyes were not yet open." Then adds "Our friend, Dr. Desel, whom we have already mentioned, saw 3 young ones taken out from the hollow of a tree which was 30 feet from the ground. On 4 occasions, we have had opportunities of counting the young, either in the nest or having been very recently taken from it. In every case there were 3 young ones."[36]

In Carolina, they are produced toward the end of March or the first week of April, and in Pennsylvania 2 were taken May 15th, apparently not a week old.[37] Rhoads had sent to him a Pennsylvania specimen April 20, 1897, which contained 3 young nearly ready for birth. This agrees with other testimony that in the North the young ones come about May 1.

The Father

Analogy, and we have no positive data, leads one to believe that the Wild-cat is monogamous but that the male has nothing to do with the kittens while they are blind and helpless in the nest. At that time, however honourable his intentions, he is certainly sent elsewhere about his business by the anxious mother.

Whether he comes back later to do a share of the work in raising the brood is yet to be proved. So far, no one has offered any observations in point.

[36] Q. N. A., I, pp. 13–14.

[37] As above, I, p. 13.

For the benefit of those who have opportunities to see, I suggest: the presence of 2 adults with a family of young Bobcats in May, June, July, or August, is partial proof that the male helps in rearing the young.

It is, of course, much stronger if these adults be proved male and female; and if, further, the male is seen bringing food or defending the little ones, the evidence is nearly conclusive.

Family Life

The most interesting picture I find of the Bobcat family life is given by "Blennerhassett" of Parkersburg, W. Va. He was on a fishing trip in the mountains of his state one autumn day, and noticed a chestnut tree that had yielded an unusual crop of nuts. He proceeds: "While I was looking at the tree and admiring its beautiful proportions, a full-grown Wild-cat with 2 kittens so small that they were barely able to keep up with the mother Cat emerged from a clump of underbrush a few yards below.

"The old Cat was doubtless giving her young a lesson in woodcraft, but she had committed a serious error in bringing her little ones to that particular spot, as she seemed to realize in a moment; for, after a few sniffs at the ground and in the air, the hair on her back went up in a line from the top of her head to the end of her short stubby tail. Then catching one of her kittens by the loose skin on the back of its neck, she sprang up the chestnut tree as quick as thought, and deposited the kitten upon a limb close up to the bole of the tree.

"Leaving the startled kitten there, she quickly scrambled back to the ground, and caught up the other young one just as an enormous old half-wild Razorback Boar, with tusks at least 5 inches long, dashed out of the brush not a dozen feet away, closely followed by a wild Sow with a litter of Pigs about the size of Rabbits. The Cat barely made her escape, for before she had ascended the tree 10 feet, the old Boar was stamping and grunting in baffled rage at its foot.

"After depositing her kitten in the crotch of a limb, the Cat descended to one of the lower branches, overhanging the ground, but out of reach of the wild Boar, who was tearing around the tree, foaming at the jaws, and snapping his great teeth with rage. Neither of the animals saw me as I peered through the brush of laurel above them, and as I was on the leeward side, they could not scent me at that distance, and I sat there forgetful even of the big trout I had climbed the mountain to catch, and looked on, wondering what the old Cat was up to, for that she had some particular object in view when she took up her position so close to the ground, I was satisfied. That she intended springing upon the wild Boar and fighting it out then and

Plate XL. Bobcat hunting.

there, I could not for a moment believe, for I knew—and she must have known even better than I—that she was no match for an animal that a full-grown Bear would have hesitated to tackle.

"But the old Wild-cat had no intention of testing the fighting qualities of the Boar, though she kept a close watch upon his movements. Meanwhile the Sow and her Pigs seemed to become satisfied that as long as they had the protection of the Boar they were entirely safe, and in a little while they began to feed upon the chestnuts, which literally covered the ground beneath the tree. Closer and closer some of the young Pigs approached to the ground beneath the limb upon which the Cat crouched, until at last one of the Pigs, while rooting around among the leaves, worked its way to a spot a little to the right and almost beneath the crouching Cat. I caught a slight movement of the latter as she crouched lower and lower, and a second later she sprang out and landed upon the unfortunate Pig. Then an agonized little squeal from the Pig, and the Cat was bounding away with the wild Boar in pursuit, the Cat carrying her victim in her mouth, much as a pointer Dog carries a fallen game bird, bounding along the mountain shelf in plain view, seeming barely able to keep out of reach of the formidable tusks of the Boar. Over fallen logs and rocks they ran, the Boar sometimes so close that it seemed to me he would overtake her in another second; then around a clump of brush, a big log, or rock, they would disappear for a moment, to reappear with the Cat still ahead.

"How long the chase had lasted I do not know, so interested was I, but I saw her at last at the foot of a ledge of rocks a couple of hundred yards away. One glance must have convinced the Cat that she could not ascend the cliff weighted down with the body of the Pig, for she gave it a vicious crunch and threw it aside just as the old Boar crashed through the brush a few feet away. Then, with a screech of rage and victory, she sprang up the rocks and disappeared, leaving her enemy champing and frothing over the body of the dead Pig.

"Turning my attention now toward the chestnut tree, I found that the Sow and her family had also disappeared in the undergrowth, and while I was looking, the old Cat crept out of the brush and sprang up the tree to reappear a minute later with one of the kittens in her mouth. Dropping the little bobtailed fellow at the foot of the tree, she reascended and again returned with her remaining kitten; then after fondling and purring over them a few minutes, for all the world like an old house Tabby, she trotted off, followed by her family, and disappeared in the forest."[38]

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[38] Forest & Stream, June 15, 1907, p. 935.

Sociability

Game Warden F. J. Durgin of Somerset County, Maine, reports having seen the tracks of 11 Wild-cats in one drove, and says it is a common thing to see 3, 4, and even 6 at one time.[39]

Allan Brooks says of the Plateau Wild-cat (*uinta*): "They seem to hunt in company, as I once saw the tracks of 5 travelling abreast of each other in newly fallen snow."[40]

Thus it is like its cousin, the Lynx, in being somewhat sociable at times.

Voice

Animals high in the scale usually have vocal powers that correspond with their sociability. The Wild-cat does even better than that rule.

"An individual," says Bachman, "that was kept alive at Charleston, and afterward for a short time at our house in the City of New York, showed its affinity to the domestic Cat by purring and mewing at times loud enough to be heard at some distance. At the former place its cry was several times mistaken for that of the common House-cat. In the woods, during the winter season, its loud caterwauling can be heard at the distance of a mile."[41]

As everyone knows who has seen a newly caged Wild-cat, it is one of the most ferocious looking brutes in the Zoo. It distorts its face with all the lines expressing rage, almost with no provocation, and growls, puffs, hisses, and spits in true style of a fighting Cat, but seems to do it oftener and more readily than any other of the group. It is largely from this perpetual ill-humour that the name "Wild-cat" has become a synonym of fighting ferocity.

Like the Cougar, the Jaguar, and others—probably all others of the family—the Wild-cat has nearly the same vocabulary as our House-cat, but multiplied and intensified in proportion to the creature's greater size.

I have indeed heard the Wild-cats' yells described as appalling at times, precisely like the most hair-lifting efforts of the Cougar, but, of course, less loud and far-reaching. In the Lynx chapter is a description by John Burroughs of that animal's midnight serenade; it is more than likely that the account applies equally to the Wild-cat.

Curiosity

Most wild animals that have high mentalities and are not perpetually afraid have a large share of curiosity to which they commonly yield. The

[39] Forest & Stream, Jan., 1911, p. 135.

[40] As above, Mar. 13, 1909, p. 412.

[41] Q. N. A., I, p. 13.

Wild-cat, like the Lynx, the Cougar, the Jaguar, and other kinsfolk, often follows the hunter out of mild, unhostile desire to find out what this new strange critter is like and what he is up to now.

Ransacker writes: "While fishing for trout near camp [in Shasta Mts.] upon another occasion, I saw some animal following me at close range. Dropping my rod, I walked carefully around some rocks and bushes and came within 10 feet of a Lynx [Bobcat]. This one immediately turned, jumped away a few yards and crouched down. He remained there until I went a short distance to camp and returned with a gun. When he saw me returning, he started away, but he was too leisurely inclined to save his life. I believe that this was the only one I ever saw that seemed aggressive, and I think he was more inquisitive than otherwise."[42]

Swimming

It is not a very active swimmer, and yet is ready to take to the water, especially if it be not too cold. Bachman observed one crossing the Santee River of its own free will, and at another time saw one swimming across some ponds to make its escape from the Dogs. He adds, however, that when it has taken to the water during a hard chase, it soon after either ascends a tree or is caught by the hounds,[43] from which we agree that up aloft it has a better feeling of security than afloat. Later on is an incident given by Harry R. Walmsley that details the half-mile swim of a Bobcat in an icy flood. The creature dodged it as long as possible, but took the water bravely when it had to.

Shyness and Slyness

I have lived for a number of years in their country and never yet saw but one living Bobcat until it was either trapped or treed by Dogs. Manly Hardy, who lived for over 50 years among Wild-cats and trapped many, says he never saw but one out of a trap.[44]

This is partly due to their nocturnal habits, but chiefly to their consummate stealth, their successful furtiveness, for they do prowl occasionally in the full blaze of sunlight.

Food Habits

In Dixieland, the natural food of the Wild-cat is the little folk of the underbrush, especially such as live on the ground—Rabbits, Squirrels, Chip-

[42] Forest & Stream, Aug. 10, 1907, p. 212.

[43] Q. N. A., I, p. 13.

[44] Forest & Stream, July 27, 1907, p. 132.

munks, Rats, Mice, grouse, quail, turkeys, meadow-larks, ground-birds of all description, and eggs.

It never finds a nest of big bird or small without sucking or devouring every egg in it, no matter what their condition.

It is very rarely that it gets a bird in the trees, even while they are roosting; for the smaller ones are too small to find, and the bigger ones, like turkeys and grouse, are too alert.

When it discovers a flock of wild turkeys, it will generally follow them at a little distance for some time to study their course. After having learned that, it makes a rapid détour, and hiding behind a fallen trunk, or in the lower branches of some tree, patiently waits in ambush until the birds come within reach; then with a sudden spring secures the nearest.[45]

During a visit to northeastern Arkansas in the first week of Feb., 1920, I was told by several hunters that the high prices commanded by furs were stimulating the trappers to such an extent that Bobcats (*Lynx rufus*) were getting scarce, and the immediate result of that was a marked and steady increase of wild turkeys.

The stalking of the turkeys, as well as the capture of Squirrels and Chipmunks, must have taken place in daylight, for the Wild-cat is a Lynx, and is lynx-eyed in full day.

But it is equally successful as a hunter in the dark. It is, in short, a Cat in its powers, needs, and ways of thinking.

Sometimes, by way of variant, it will, in sultry weather, follow the dry beds of streams or brooks to pick up the catfish, etc., or crayfish or frogs that remain in the deep holes of the creeks during the drought of summer.

So far, it has not been proven to dig out the eggs of turtles or to eat snakes or insects. Otherwise its bill of fare includes every living thing in the square mile that it considers home. Nor does it stop here if necessity drive. For the farm and the farmyard are really fine sources of revenue, provided an offset can be found for those unpleasant accessories, the Dogs and guns. The best answer to the problem is found in stealthy approach and black darkness. Like the Ocelot, it is a marvel in such raid work. Lambs, little Pigs, turkeys, geese, ducks, and chickens are acceptable in proportion to their size. And the damage of one Wild-cat is estimated by Bachman to equal that of a dozen Gray-foxes.[46] There is, I believe, one bird of the barn that it rarely or never gets; that is the guinea fowl. For no matter what the hour, the light, or the suddenness of the attack, the guinea has the wit to spring that infernal alarm racket for which she is so notorious, and the re-

[45] Q. N. A., I, p. 12.

[46] As above, p. 8.

sult is that the exquisite nerves of the high-strung Wild-cat are so much shell-shocked by the hideous grating uproar that he loses not one instant before taking precipitate flight.

As evidence of the Wild-cat's destructiveness, note the following by Manly Hardy: "My father once saw 13 fully grown Sheep which 2 Wild-cats had killed in one night on Mt. Desert Island. I know of several cases where Wild-cats have entered barns and outbuildings and killed numbers of hens and ducks."[47]

In Texas, "the food of this, like other species of Lynx, consists mainly of Rodents, Rabbits, Wood-rats, Groundsquirrels, Gophers and Mice, with a few birds and occasionally some poultry."[48]

"Most of the Wild-cat's hunting is done at night, but occasionally one is surprised at midday crossing a valley to another cliff, or found toward evening getting an early supper. One shot among the rocks near Alpine just before sundown had already caught and eaten a Wood-rat, which made a good beginning for a meal."[49]

The stomach of an individual killed in Big Thicket "was full of venison that had not been perfectly fresh when eaten, probably from a Deer that had been wounded by some hunters a week before. The hunter with me said he had examined the stomach of one, not long before, that was full of Wood-rats, and Gaut found Wood-rats in the stomach of one examined at Sour Lake."[50]

"Here and there in some rocky corners of the cliffs [in Texas], one finds elongated pellets of bones and fur, some freshly deposited, others old and bleached, and these throw important light on the food habits of the animal. Bits of fur, teeth, and jaws serve to identify many of the mammals that have been eaten, and usually disclose a great preponderance of Rabbits and Wood-rats. Traces of many smaller rodents and a few bird feathers and bones are found, but no remains of food other than animal. The ranchmen complain of some poultry being killed, and still worse, a few Sheep, as well as young Goats and Pigs. This, with a few quail and other birds, is about all that stands against the account of the Wild-cat, with a much larger amount on the credit side."[51]

In British Columbia, where the form is the Plateau Wild-cat (*uinta*), its sources of support are comprehensive as elsewhere, and Allan Brooks

[47] Forest & Stream, Mar. 13, 1909, p. 412.

[48] Texas, p. 170.

[49] As above, p. 170.

[50] As above, p. 170.

[51] As above, p. 171.

remarks: "In habits, the Plateau Wild-cat species resembles other species, being rarely seen even in districts where it is common, doing nearly all its hunting at night, though I once observed one hunting *Spermophiles* at noon of a summer's day."[52]

In California, D. W. Maxey, of Gorman, testifies that he "recently opened up 2 Wild-cats (*Lynx eremicus californicus*) to see what they had been eating. In the stomach of one, I found the remains of 2 small Plymouth Rock chickens which must have been caught at least 5 miles from where the Cat was killed, and in the other the remains of 3 mountain quail."[53]

On the same page, H. H. Hunt writes: "Wild-cats feed on the smaller game animals and birds. I watched one of these animals in his attempts to secure a breakfast last summer. He stole up on a covey of mountain quail, and as he flushed them, got 2. I have found feathers of both mountain and valley quail, which investigation proved were left from a feast by Wild-cats."

Similarly, in the July, 1919, number of the same magazine (p. 160), Donald D. McLean says: "On March 10, 1919, I killed a female California Wild-cat near Coulterville, Cal., which had been feeding entirely on song birds. The stomach contained the remains of 6 Western robins."

It is quite possible that the tragic incident given later was the result of the Bobcat mistaking the horned owl for a wild turkey.

Hunter

The Wild-cat is essentially a hunter, and lives on new-killed prey, preferably, although not exclusively, his own catch. While primarily his living is drawn from creatures of lighter weight than himself, there are times, or perhaps it is better to say there are Wild-cats, that break all rules, and in the vigour of their personal prowess, delight in matching their power with that of vastly bigger and doughtier game. Rhoads tells of a Wild-cat that was riding to its death a female Deer.[54]

Game Warden F. J. Durgin of Somerset County, Maine, claims that they kill many Deer.[55]

In Maine, "the Wild-cats kill more or less Sheep and Deer," says M. Hardy, and adds: "I know one man who saw 3 eating on a Deer which they had killed. . . . Like the Lynx, Wild-cats bite the throat of Deer and

[52] Recreation, Sept., 1902, p. 174.

[53] Cal. F. & G., Jan., 1920, p. 37.

[54] Mamm. Penn. & N. J., p. 140.

[55] Forest & Stream, Jan., 1911, p. 135.

Sheep. My father once saw 13 Sheep hauled in on a sled, all killed in one night by 2 Wild-cats, and all had their throats bitten."[56]

And Stephens, in his account of the Desert Bobcat of California, says: "I can learn of but 3 instances of their having attacked people, all occurring in San Diego County. Two of these attacks were unprovoked, and the third was practically self-defense."[57]

Fighter

Shy as any wild thing is the Bobcat, rarely seen except by accident, and then is quite ready to forego all battle honours and retreat in search of peace. Nevertheless, like many a timid, law-abiding citizen, he can be terrible when put to it by desperation.

A. D. McCandless, speaking of hunting Bobcats in Nebraska, says that he saw one "killed in a swamp in Cherry County, in this State, 2 years ago by 6 hounds. These Dogs were large and very savage, being a cross of Greyhound with the Staghound. They were kept and used for killing Coyotes and Wolves. They are owned by Mr. S. E. Stilson, of Pullman, Neb., and any one interested can learn something about Lynx and Wild-cat and the fighting ability of each by writing to him. I have seen a good many packs of good fighting Dogs in the Coyote country, but never one as formidable as the Stilson pack, and I can verify the fact that when they got through with the Lynx, they were each and all badly used up; but that same pack of Dogs will kill a Coyote and never get a scratch."[58]

"Ransacker," after hunting Wild-cats or Red Lynxes for 30-odd years, killing half a hundred in that time, writes from Shasta Mountains, California:

"It is true that Cats are not aggressive fighters, and any small Dog may sometimes tree them. A tree is their natural refuge, and any alarm may cause them to go up a tree. The same is true of the Cougar or the Panther, and probably the Leopard, and most of the Cat tribe; but when a Lynx desires to come down and go about other business, the Dog or man that stops him will have about all the entertainment he can use if he omits the use of firearms or other villainous devices. Give a full-grown Lynx a bush or two as cover, and the Dog that can kill him will have to use about all his courage and ability. I do not believe there is a 30-pound Dog that can whip a Lynx of the same weight on open ground.

"It is a mistake to consider these animals cowardly. Their nature is

[56] Forest & Stream, July 27, 1907, p. 132.

[57] Cal. Mamm., pp. 211–12.

[58] Forest & Stream, Sept. 14, 1907, p. 413.

subtle like that of all the Cats, and they are doubtless more peaceably inclined than most carnivores, but if we have in either America an animal that will make a hotter corner in proportion to his size, when forced to fight, I will have to be shown to admit it. They are cautious, subtle, and gentle, except when their ferocity is aroused by hunger or attack. Their teeth and claws are not long, but they are sharp, and the animal is about as active and sinewy as any that goes about on four feet. I consider him one of our handsomest, cleanest, and most intelligent animals.

. . . . . .

"While riding in search of stock with an old resident of the county, Mr. J. J. Bell, his Dogs treed a large Lynx. There were 4 large Dogs, and they would attack anything from Wild-hogs to bulls. The Cat was but 10 or 12 feet up the tree, and we dismounted, and Bell tried to prod the Lynx out of the tree with a pole. Before he could reach him, the animal sprang to the ground, evaded the 4 Dogs by dodging and fighting, and reached a second tree.

"We followed and Bell again tried to reach the Lynx with the pole. It sprang from branch to branch, without trying to go very high, and watching its opportunity, it again sprang down, and fighting the Dogs as it ran, got into a third tree, a very large oak. As we were now near a dense thicket of chaparral, Bell decided to go home for a rifle. He had to ride about 2 miles and return, and I was left to keep the Cat up the tree with the help of the Dogs. For a time the Lynx kept me busy from one side to the other of the tree, but after a while he crouched down and was content to stare me in the eyes, occasionally opening his mouth as wide as he could, and showing his teeth, of which he seemed to have a full set. In his threats, he made no sound, but seemed to intimate very clearly that he would bite if he had to do it, but that he would rather be left alone. When Bell returned with his rifle, he aimed to break a paw of the Lynx in order to let the Dogs finish him. He aimed a trifle too high and shot him through the heart, killing him instantly or nearly so. I wanted the Lynx to get away, but Bell believed they killed his Sheep and he encouraged his Dogs to hunt them.

. . . . . .

"When upon another ride with Mr. Bell, the same Dogs treed another Lynx. This one jumped out of the tree as we reached it and ran into a clump of vines and willows on the river bank. All 4 Dogs went in after him ferociously. We saw the Lynx lie back against the vines and fight the 4 Dogs off for a full minute. He then got deeper into the jungle, and after an hour or so of effort, all the Dogs came out, more or less scratched and torn, and beyond question defeated.

"Again while returning from a hunt after Deer with a friend we saw a Lynx drop from a tree into the trail a few yards ahead of us. My 2 Hounds, that would keep a Bear quite busy, sprang after it. The Dogs overhauled the Cat within a hundred yards and stopped it 4 or 5 times before it got to cover. Each time the Dogs were in such close quarters with the Cat, we could not get in a rifle shot, although we followed for some time. After chasing the Cat up a timbered mountain for a mile, the Dogs returned to us without having been able to tree the animal, and both of them had scratches and cuts to show that they had tried repeatedly at close quarters."[59]

H. L. writes: "The first Cat hunt I went on in Texas, we treed a Bobcat that probably weighed about 25 pounds. The tree was a mesquite, and the Cat was about 20 feet from the ground. According to custom, the boys were going to shoot him, when the tenderfoot exclaimed, 'Oh, don't do that; let me climb up and punch him out, and let him fight the Dogs, as we do the 'Coons back in the States.' Did they let me? Sure; I did not hear one word of objection.

"I easily climbed up to within punching distance, and with a 6-foot stick proceeded to punch the Bobcat that, according to a certain article, had never been known to attack a man, even when in order to make it sit up and look pleasant it has been teased with a short stick among the branches of its arboreal retreat. The Bobcat was facing me as I climbed up, and his remarks showed that he did not care for closer acquaintance. At about the third punch he jumped, and for a month afterward I could show proof that he did not jump toward the Dogs. Claw marks in both shoulders and teeth marks in my arm that I had interposed to protect my face and throat proved conclusively to my mind that they will attack, and that with very little urging.

"We sailed out of that tree together. I did not stop to climb down, just let go everything and sailed. Fortunately for me, the minute we struck the ground, the Dogs took a hand and relieved me of my most unwelcome companion.

"When I had time to look around, I thought the boys were having fits. They nearly rolled out of their saddles—we always hunted on horseback—laughing at my 'great act.' To them it was probably funny, but the next time we wanted a Cat, and we killed dozens of both the Bobcats and the Spotted Cats—Ocelots—during the winter, we sent for him with a pistol ball."[60]

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[59] Forest & Stream, Aug. 10, 1907, p. 212.

[60] As above, Jan. 14, 1911, p. 55.

Tamability

It sometimes happens that the fiercest animals respond most completely to the gentle methods of a tamer, especially when captured young. I never knew of a Wild-cat captured full grown that wasn't a very spitfire demon with a perennial growl and a physiognomy distorted with diabolic rage whenever approached. But I have seen a two-thirds grown Oklahoma Wild-cat that was tame and playful as a kitten. It rolled about on my lap, and made endless gentle attacks on my fingers.

But again we must beware of hasty generalization among animals of so much individuality.

Bachman writes of one which he secured when only 2 weeks old.

"It was a most spiteful, growling, snappish little wretch, and showed no disposition to improve its habits and manners under our kind tuition. We placed it in a wooden box, from which it was constantly striving to gnaw its way out. It, one night, escaped into our library, where it made sad work among the books . . . and left the mark of its teeth on the mutilated window sashes. Finally, we fastened it with a light chain, and had a small kennel built for it in the yard. Here it was constantly indulging its carnivorous propensities, and catching the young poultry, which it enticed within reach of its chain, by leaving a portion of its food at the door of its house, into which it retreated until an opportunity offered to pounce on its unsuspecting prey. Thus it continued, growing, if possible, more wild and vicious every day, growling and spitting at every servant that approached it until, at last, an unlucky blow as a punishment for its mischievous tricks put an end to its life, and with it to one source of annoyance."[61]

Then, again, according to C. H. Townsend: "W. E. Bryant of Oakland had a pair of tame Lynxes at his home in 1885, which were as affectionate and agreeable pets as could be desired, purring contentedly in true Cat fashion when their fur was stroked. This, however, is very unusual with Lynxes; they are bad-tempered and savage. One which was kept caged at the McCloud River fishery for 2 or 3 years was always the most vicious creature imaginable, snarling and glaring at every one who approached, with an expression truly satanic."[62]

The one from which I got the black tracks (see Plate XXXVIII) was as tame as a House-cat. It sat in my lap and purred like a kitten. Its tooth-and-claw play was rather rough at times, but it had no evil intentions.

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[61] Q. N. A., I, p. 14.

[62] Nat. Hist. Calif., Proc. U. S. Nat. Mus., 1887, p. 189.

It was not quite fully grown, being but 10 months old. Its feet, however, were about the full size.

Use to Man

I wish I could translate into dollars and cents the pleasure it gives to many people when they meet with a Wild-cat or even find its tracks. This, however, is a sentimental and æsthetic pleasure, like that we get in a theatre, a book, or a good picture, and most folks do not yet know this, so I must seek other ways of making an appeal to their interests.

William Lloyd, the naturalist, states in his report on Texas, that along the Rio Grande and in Cameron County "most of the ranchmen will not allow the Wild-cats to be killed, for fear their ranches will be overrun with Wood-rats, Mice, and Rabbits." "Not only in this region, but farther north and east, this fear has been realized many times, in swarms of Wood-rats, Cotton-rats, and Rabbits, but the services of such predatory mammals as Wild-cats, Foxes, and Coyotes are not always recognized by the ranchmen."[63]

As fully detailed in the Coyote article, the destruction of some 84 fur-bearers, including 8 Wild-cats, on the $10\frac{1}{2}$ square miles of the Spring Valley Water County, San Francisco, Calif., was followed by a *decrease* of the quail, indicating at least—if it indicates anything—that the Bobcat is not an unmitigated nuisance among game birds.[64]

An unexpected use for the creature is as a table-meat. Many a hunter has made a meal of this Cat. Merriam tried it and says he "can pronounce it excellent. It is white, very tender, and suggests veal more than any other meat with which I am familiar."[65]

Strange Incidents

The following delightful incident was contributed to *Fur News*, July, 1911 (p. 32), by W. L. Dougherty, of Steuben County, N. Y.:

"About 39 years ago, when I was a boy 8 or 9 years old, my mother sent me one day in summer to a neighbour about a half mile away on an errand, so of course I had to go; but it was as far across the fields as by the road. I went the road, but coming back I came across and had a small piece of woods to go through. Well, I got about halfway through them when I heard something that sounded like a Cat crying, and I looked around and spied it near a tree close by. I called 'Kittie, Kittie, Kittie,' but it

[63] Texas, p. 169.

[64] Cal. F. & G., Oct., 1922, pp. 230–31.

[65] Mamm. Ad., p. 41.

would not come nor move, so I started toward it, intending to take it home, as father was fond of that coloured Cat.

"I edged up to it and it backed off, so I started to go, but it started to come too, so I tried my luck again and got closer than at first, but it backed off as before. When I started on again, it also started and so I let it come up as close as it would and then tried again, and this time I got it by the neck and held on to it; I had the fight of my life to keep it, but I did and carried it home, and in the house, and told mother to shut the door, which she did, and then I let the Cat down.

"It tried to get out, but it could not, and finally it went in mother's bedroom, got under the bed, and stayed there until father came home at night.

"When he came home I told him to shut the door so as not to let the kittie out, for I had a nice one for him. He asked me where I got it and I told him. He asked where it was and I said under the bed. He got down and looked, and as soon as he saw those eyes he was scared, but said, 'Yes, a d—— Wild-cat,' and it was one, and about half grown at that. Well, it is needless to say that daddy killed it then and there."

"In 1873 or 1874," says Merriam, "I shot a grouse as it was flying along the north side of Mt. Tom, in Massachusetts. Scarcely had it touched the rocky slope when a Wild-cat sprang upon it from behind a neighbouring bush and, in a succession of rapid leaps, started up the side of the mountain with the grouse in its mouth. The contents of the other barrel of my gun caused him to change his mind as well as direction."[66]

When visiting Dr. David Starr Jordan in California, April, 1901, he showed me a remarkable photograph, the mummies of a Bobcat and a great horned owl locked in a death grip. The owl's talons were embedded in the Bobcat's head and one paw. His bill held the other paw. They were found under a cliff 40 feet high in the desert near Coalinga, Fresno County, Calif., by E. R. Graham. One or other of these enterprising hunters had caught a tartar. (See Plate XLIV.)

The Age It Attains

In Washington Zoo, they had a Montana Bobcat that was about 6 months old on arrival and lived there 15 years and 4 months. They had a California Bobcat which, adult on arrival, lived there nearly 14 years; and a Florida specimen that, though adult when it came, lived 13 years and 1 month. A male Bobcat from Virginia, received Feb., 1909, an adult on arrival, is alive and well, but blind since 1922, and obviously very old. In a

[66] Mamm. Ad., p. 41.

state of nature, he would have succumbed when his eyesight began to fail. Therefore, we cannot suppose the wild Bobcat to live more than 10 or 12 years.

Hunting the Bobcat

Throughout its wide range, the Bobcat is prized as a beast of the chase. And the hunt is carried on much the same as for a Fox, but it usually ends here by the Bobcat taking to a tree.

Bailey says that in the Big Thicket of Liberty and Hardin counties, Texas, "its tracks were seen in every muddy spot in roads and trails, and on damp mornings the Dogs started one about as soon as they got into the thicket. The Cat would rarely tree, but usually, rabbit-like, would run round and round in a limited circle in the thickest part of the swamp, depending on outrunning or dodging the Dogs. Cat-hunting is a favourite sport in this region, and the hunters usually take stands in open spots and wait for the Dogs to drive the game within shot. In one case I shot the Cat in front of the hounds as it passed me for the third time. It did not seem tired or much alarmed, but easily kept out of sight of the Dogs."[67]

Bachman gives a good description of hunting this animal in Dixieland. "The hunters," he says, "often run down the Wild-cat with packs of fox-hounds. When hard pressed by fast Dogs, and in an open country, he ascends a tree with the agility of a Squirrel but the baying of the Dogs calling his pursuers to the spot, the unerring rifle brings him to the ground, when, if not mortally wounded, he fights fiercely with the pack until killed."[68]

This is indeed the finish of most Bobcats that are not taken in steel traps—a finish that old Æsop seemed not to have known, or he would not have presented his Cat that invariably found safe sanctuary when the fleet-foot game had failed—that is, climbed a tree to mock at the Dogs below.

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[67] Texas, p. 170.

[68] Q. N. A., I, p. 6.

THE GENTLE MOTHER BOBCAT[69]

By Harry R. Walmsley

The river had been sinking lower and lower, day by day. In some places, it had narrowed until it could hardly be called a stream. The long drought and the hot, devastating winds had seared every green thing, except a small fringe here and there along the banks of the river. I gazed out over the parched and sizzling plain. The hot air came up from the ground in wavering tongues, like flames of fire. Day after day, month after month, the sun had poured out its rays from a sky of brass. Most of the wild things had migrated.

I sat looking across the desert valley toward a horizon mirage with phantom trees and lakes. Now and then a lizard ran over the sand or played tag with a brother or sister in the hot sunlight. High in the dusty vault overhead some vultures floated, miles apart, waiting and hoping for the stream to dry, so that they might feast on the lean Cattle that stood knee-deep in pools of water, listlessly switching their tails at imaginary flies. Glen, a beautiful red Irish Setter, lay curled up back of the stove in the shack, taking his regular siesta.

The shelter of a lone cottonwood tree gave me some feeling of comfort as I dozed, dreaming of the Northland's cool and shadowy pools. The very elements were asleep. Beetles buzzed about, making sounds like human voices. A black-and-white House-cat dozed on the window sill of the shack a few feet away. Danger seemed as far off as the snows of Alaska.

Suddenly a dark shadow flitted across the window sill, and, like lightning out of a clear sky, a bolt fell upon the Cat. A soft thud, a muffled squall, and she was gone.

I ran around the shack in time to see a ghost-like Bay-lynx carrying the Cat through the shrivelled sorghum plants and down the river bank. Knowing the timidity of the Lynx, I was startled at such a daring onslaught. I ran into the shack and picked up a coat containing cartridges, and a sawed-off shotgun that could hit every object within a radius of 50 feet. Calling Glen, I followed the Lynx to the river's edge. Here I paused and showed Glen the tracks left by the little pads in the soft mud.

"Wild-cats, Glen! Hunt 'em up!"

[69] By permission from Recreation, March, 1915, pp. 135–36.

Glen was immediately transformed from a sedate and listless Dog into a frenzied hunting Wolf. The trail led across the soft mud of the drying river, up the opposite bank, through a half mile of mesquite brush, along a line of rocks, to a low cliff. At last Glen stopped, and began to bark furiously into a hole between the rocks. I crawled into the hole, pushing the gun in front of me ready for defense. About 4 yards back the hole widened out into a room 20 feet square. In the dim light at the far end I could see the Bay-lynx jumping from side to side of the cave. I covered her with the gun, just as my foot kicked something soft that gave out a nasty spit and snarl. Looking down, I saw 2 little blind Lynx kittens and a dead black-and-white Cat. Watching the old Lynx, and keeping her covered with the gun, I wrapped the kittens in the coat. While the old one snarled and swore, she showed no desire to come any closer.

I had long believed that House-cats were among man's greatest enemies on account of the havoc they created among the birds. Here was a Bay-lynx that evidently had evolved an especial fondness for the flesh of House-cats. If she produced more of her kind, man would be infinitely the gainer, so I concluded to let her live, provided that she made no attempt to interfere with my adoption of her babies. I gathered up the little spitting devils in fur, and crawled out backward. Glen had obeyed orders to watch outside, and now he was perfectly frantic to own one of the kittens; but I had a purpose in keeping them. I would raise them, and teach them to live on House-cats, and then take them back north and turn them loose.

I built a nice little house for the kittens, and fed them milk from sponges. Although they were young and blind, they fought furiously whenever I touched them. I wondered how they had learned to recognize the man-smell as that of an enemy.

That night, as I looked out of the window, I saw, in the yellow moonlight, the mother Lynx slip quietly around the shack, and then I heard her mourning up and down the river bed. I felt sorry for her, and ashamed of my cruelty; but I did want those little, spitting, swearing imps.

The next day, they sucked the sponges frantically, snarling and spitting all the while.

Great masses of clouds gathered all that day, and lightning came, flash upon flash, with crashes of thunder that reverberated from hill to hill, like volleys of artillery. But not a drop of rain. Then, as darkness settled down, the skies opened. The rain came down in torrents, and with it much hail. Through the roar of the storm, I heard the wails of the grieving mother Lynx, mourning her lost ones. My heart smote me, and I determined to give them back to her the next day.

Plate XLIV. The Bobcat & Horned Owl – a double tragedy found under a cliff at Coalinga Calif.

The dawn came. The river was bank full and running swiftly, carrying down brush and Cattle. The rain came harder and harder, till the whole plain was a sea. Across the river, where the Pecos Valley Railroad was in course of construction, came a hand-car, manned by 2 workmen. They stopped opposite my shack, and yelled that the Eddy Dam had given way, and I would have to run for my life.

I threw the box containing the mother Lynx's darlings upon the roof of the shack, called Glen, got in the basket of my private trolley, and crossed the river to the hand-car. Then we worked hard to get out of danger. We stopped at another place, 5 miles down the valley, and picked up a man and his wife. The water was gaining on us, but we were headed toward a broad valley where the flood would have fewer terrors for us. The crest reached and passed us, leaving us safe but not dry.

A week later, the water had subsided and I went back to where my shack had stood. Only a sea of mud met my gaze. All landmarks within 50 miles had disappeared. My poor little Lynx babies, no doubt, met an easy and painless death, but to this day I feel a shameful sense of guilt whenever I think of them. I hope the mother was saved. May her tribe increase.

As the years passed, I often thought of the poor little Lynxes nailed up in a box, rolling over in a flood of water; and these thoughts only made stronger the conclusion to which I had been forced—that all wild things should remain wild; that it is cruel and unjust to deprive them of their liberty and pen them up for ignorant people to gaze at and annoy.

I took every opportunity of getting acquainted with the Bay-lynx, as well as with other animals; and I learned to realize more and more that, in our ignorance of their motives, we place a totally wrong interpretation upon their actions, their seeming cowardice and timidity. I learned that, far from being a coward, the Lynx could be brave enough when bravery was justified. During years of camp life in the West, I came to understand that it was wisdom alone that caused the Lynx to avoid collision with man. He had simply acquired the hard-won knowledge that, for him, all argument with the man-animal meant serious trouble, and probably death.

The Pecos Valley incident, however, had made me long for a chance to force a Lynx into a position where it would believe it had to fight. I felt the keenest desire to watch its process of reasoning.

THE PEACE-LOVING FATHER BOBCAT[70]

By Harry R. Walmsley

. . . One day in March, . . . I was tramping along the banks of the Kansas River. The cold had held on with discouraging intensity up to a few days previous; but now, the spring had opened in a mad rush to meet the summer. I climbed a hill to watch the sun sink to rest in the crimsoned waters of the river. I had just a few miles to go, and the soft glow of the evening and starlight would be more pleasant than the glare of a surprisingly fierce March sun. A yellow-bordered butterfly flitted by—surely a harbinger of spring. The liquid warble of a bluebird came from no certain place. I was watching two flickers doing a wild dance upon the limb of a dead oak tree, when a movement out on a sandbar about three-quarters of a mile distant arrested my attention. Wondering what it could be, I watched the animal shape as it moved slowly along the sand. It seemed to be examining something very intently. Looking more carefully, I was surprised to recognize the old padfooted shadow—a Bay-lynx! I slipped down the side of the hill, and worked my way through the thick growth of willow, grape, and cottonwood, between the hill and the water, toward the Cat. When I reached the edge of the wood growth, I peered cautiously through. I had stalked the Lynx merely to find out what he was doing on the sand, but I saw at once that at last I had cornered him in a situation such as I had often pictured in my mind, one in which he would simply have to fight. For there he was, away out at the tip of a long, narrow bar, that reached into the river 300 feet. He seemed to be scratching up and eating something, probably snails or clams that the warm sun had brought into activity.

The arm of sand started from the bank about fifty feet from me. The Lynx's back was toward me, and his ridiculous stub of a tail was working nervously. I stepped out of cover, and made a dash for the neck of sand. I reached it and was well out on the long arm before the Lynx realized that he was not alone. With a startled snarl, he came toward me, evidently to get back to land. Then he changed his mind, and retreated to the far point of the bar and stood at bay. Here was the reward of my years of waiting.

The river was full of floating ice, and the temperature of the water was

[70] By permission, from Recreation, March, 1915, p. 136.

PLATE XLII.—BOBCAT (*uinta*) POSES
Photographs by E. T. Seton

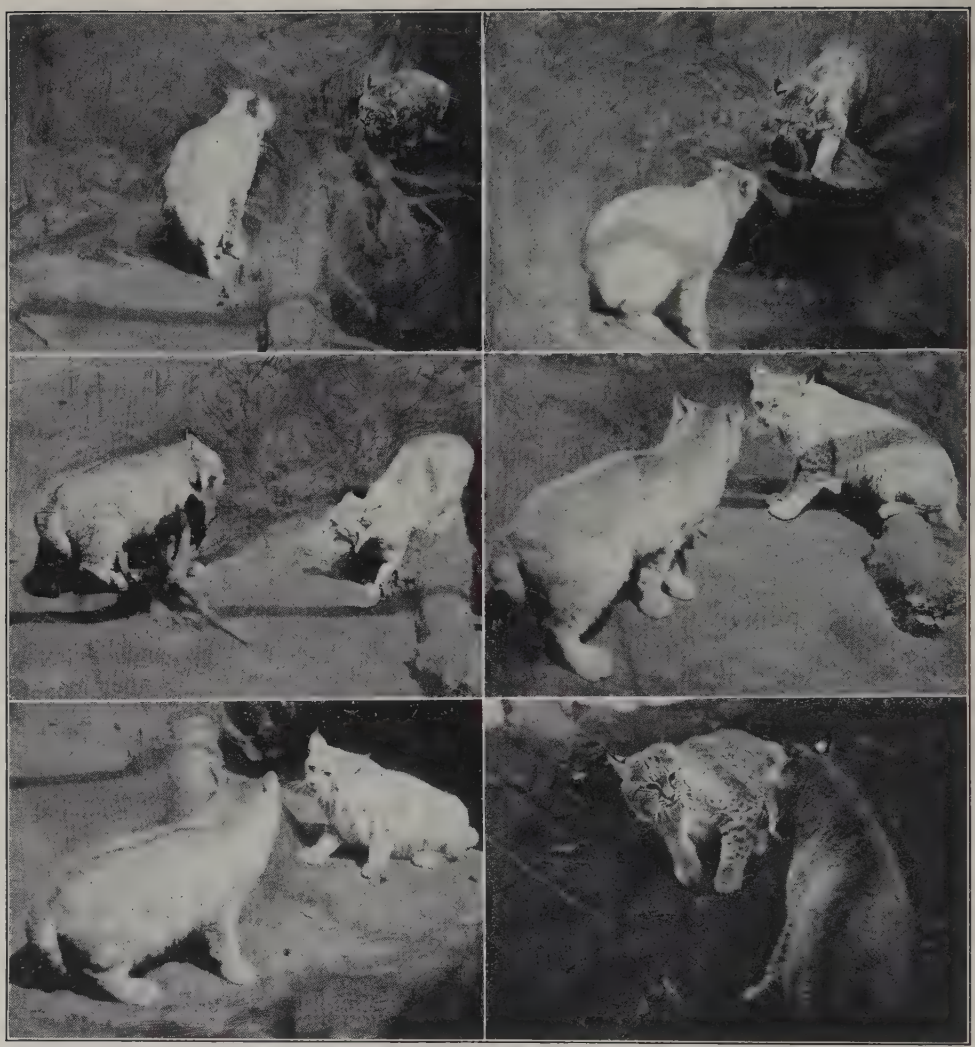

PLATE XLIII.—BOBCATS (*uinta*) FIGHTING
Photographs by E. T. Seton

about the same as that of the ice. I knew the Lynx would as soon meet a .45 bullet as that water. I knew that if I walked up to him, he would either have to jump on me, or jump into the water, and that the thought of either act was paralyzing to him. I walked slowly toward him, and though unarmed, felt safe, for two reasons: first, because I had always had an utter contempt for the attack of wild animals, and secondly, I knew that, if attacked, I could jump into the icy water, where the Lynx would not follow.

As I moved toward the Cat, he backed slowly to the water's edge, and stood snarling and spitting. He glared at me with wide-open eyes, and did a little dance as he felt the water touch his feet. I noticed that he was a fine large male. I could not help admiring his beautiful, white, pointed teeth. At a distance of 12 feet, I stopped and examined him thoroughly. He snarled and spat, and talked furiously, bluffing, as all North American Cats do. I moved toward him. He stopped his noise and crouched, but it was not good judgment, for his hindquarters sank into the cold water.

He came to an erect position with a snarl, and look of hurt surprise that made me sympathize with him. Slowly I advanced toward that pained and glaring face. He tried to back, but only picked his feet up and put them down again—the water was still there. I was within 6 feet of him. I knew that the climax was at hand. Two more steps, and we would contact.

With a final snarl, he slid sideways into the ice-water, and swam half a mile to the other bank. There he pulled himself out, and disappeared in the brush. I knew then that the Bay-lynx would never hunt trouble with man. But I have felt sorry for him during the years that have passed since. Did he leave his family or his lady-love on the other side of the river? If so, how did he get back again?

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Wolf, Gray-wolf, Big Wolf, Timber-wolf, Lobo, Lobo-wolf, Loafer, Cattle-killer, Buffalo-wolf, Buffalo-runner Mexican Wolf

Canis mexicanus Linnæus

(L. *Canis*, a Dog; *mexicanus*, of Mexico, because first known from there)

Canis mexicanus Linnæus, 1766 Syst. Nat., ed. 12, vol. I, p. 60.
Type Locality—Southern Mexico

French Canadian, *Loup gris, Louve grise.*
Chipewyan, *Noón-dee-a.*
Cree, *May-hee'-gan.*
Sauteaux, *My-in'-gan.*
Ojibway, *My-in'-gan*, or *Kit'-chi My-in'-gan.*
Yankton Sioux, *Song-toke-cha Tung-ka.*
Ogallala Sioux, *Shunk'-ah Mah-nee'-tu.*
Mexican, *Xoloitzcuintli* (Hernandez) or *Lobo.*

The genus *Canis* is composed of the true Dogs. They have long pointed muzzles, long legs, long bushy tails, and pointed ears; have 4 toes on each hind-foot and 5 on each front, but the innermost of the 5 toes is very short and small, and raised so that it does not touch the ground; the claws are blunt and non-retractile.

The teeth: Inc. $\frac{3-3}{3-3}$; can. $\frac{1-1}{1-1}$; prem. $\frac{4-4}{4-4}$; mol. $\frac{2-2}{3-3}=42$

Assuming that the Wolf covering the highlands of Central Mexico is the same as described by Hernandez in 1628 and properly named by Linnæus from his description in 1766, we must use this name as the oldest Wolf name in North America, and all of our forms of the large Wolves become subspecies of *mexicanus*, unless we make *mexicanus* and all the rest subspecies of the Old-world *Canis lupus*.

The skull of *mexicanus* is relatively short and wide, with slender muzzle and light dentition when compared with the Great Plains Wolf from Montana.

Size. Adult ♂: Total length, $62\frac{3}{8}$ in. (1584 mm.); tail, $16\frac{1}{8}$ in. (410

mm.); hind-foot, 10¼ in. (260 mm.). Skull: Basal length, 8 7/16 in. (214 mm.); zygomatic breadth, 5¾ in. (146 mm.) .

Colour. As shown by Biological Survey specimens from Mexico, this is a relatively small, dark, richly coloured Wolf, showing the usual Wolf pattern as seen in the Buffalo-wolf and Timber-wolf, but with rusty-yellow sides, nape, muzzle, legs, and tail. The back and top and tip of the tail are heavily sprinkled with black, while the lower parts are mainly ochraceous with little or no white.

Young. A pup (*nubilus*) taken by George F. Dippie at Gleichen, Alta., March 22, 1901, and presumably less than a month old, is of a dull umber-gray, darker on the lower back and on the tail; paler and buffy on the head; a large white spot on the breast; with a curious blackish mask on the muzzle, reaching to the eyes and taking in the chin. This is the usual colour of the very young. As they grow, the colour fades to a dull yellowish. When about 3 months old, the puppy coat is shed and the light-gray coat acquired. In the young Coyote, the muzzle is tawny or yellowish brown.

Size of male (*nubilus*). A good-sized Gray-wolf that I caught at Clayton, Colfax County, New Mexico, Dec. 13, 1893, was 5 ft. 2 in. (1575 mm.) from nose-tip to tail-bone tip; of this, its tail was 16 in. (406 mm.); shoulders, 27 in. (686 mm.); girth of neck, 18 in. (457 mm.); girth of chest, 28½ in. (724 mm.); girth of forearm, 8¼ in. (209 mm.). Its weight was 102 lbs.; other ♂s caught in the region weighed 90 and 78 lbs. W. R. Hine weighed the Winnipeg Wolf, a ♂ (see p. 313) at 104 lbs. The Friedensfeld (Man.) Wolf, a ♂, weighed 76 lbs.

T. P. James, of Clayton, N. M., assured me that in the fall of 1892, he killed a huge Wolf that turned the standard scales at 150 lbs.

The largest Wolf of which I have details was captured by G. W. Myers, of Billings County, N. D., in 1902. It weighed 168 lbs., and measured 7 ft. 10 in. in total length (see p. 315). These, however are extreme, and the weights taken in New Mexico more nearly represent the normal ♂.

Size of female (*nubilus*). A ♀, taken near Clayton, N. M., Dec. 29, 1893, was 4 ft. 7½ in. long (1410 mm.); tail, 12 in. (305 mm.), but imperfect; hind-foot, 10 in. (254 mm.); height at shoulders, 25 in. (635 mm.); weight, 75 lbs. Another ♀ weighed 80 lbs., and a third, a poor one, only 55 lbs.

Colour. The skin of the Colfax County, N. M., ♂ is now before me. It is, in general, a dull, yellowish-white, becoming nearly pure white on cheeks, chest, and inside of hind-legs. The upper part of the muzzle, crown, and outer side of each limb and the entire plantar surface of each foot is tinged a clear pale sienna. On the backs of the ears, the sienna is much deeper and stronger. Beginning on the muzzle between the eyes are many

black-tipped hairs which give a grizzled look. These increase in length and number, and continue over head, upper neck, shoulder, and back to the basal third of the tail, where they end in a black spot 1 in. wide and 2 in. long. After this, the tail hairs are faintly tipped brownish black; the tail itself ending in a dark tip of blackish hairs, with a few white ones interspersed.

The under-fur or wool is brownish gray on the under parts, becoming much darker on the limbs and much browner and darker on upper parts generally.

The dark spot on the tail near its base is formed by a curious tuft of stiff, black-tipped hairs, without woolly under-fur; it marks the place of the usual tail-gland. The claws are dark horn-colour.

Compared with a number of Coyote skins taken at the same place, there is no absolute difference. The Coyotes are more strongly tinged with sienna above, and more nearly pure white below. Also, their under-fur on the back is tipped with a rich brown instead of dark gray-brown. But they have the same black tuft over the tail-gland, and there is little but size to distinguish them when living.

The above colour description of the Gray-wolf agrees exactly with Merriam's colour description of the Coyote quoted on p. 356.

Colour, however, is a poor diagnostic. In Manitoba, we find gray, black, and white Wolves. Florida Wolves are nearly always black, and Arctic Wolves nearly always white, but there are plenty of exceptions, and both black and white individuals are distributed among the Gray-wolves of the Plains.

Tyrrell, who went northward through the Barren-grounds on his journey from Athabaska Lake to Chesterfield Inlet in 1893, says that all Wolves "seen for some time had been of the white Arctic variety, which do not travel together in packs like those of the timber country." But at Dubawnt Lake, a band of Wolves were encountered, all of which were gray.[1]

On April 30, 1902, when Hanbury's party was near latitude 67° between Lake Garry and Ogden Bay, Hubert Darrell, his companion, encountered a band of 16 large Wolves. Thirteen of these were ordinary dirty white, 2 were nearly black, and 1 pied.[2]

Races

The following forms have been recognized. Although distinguished here only by the external features of size and colour, it must not be forgotten that they have skull characteristics that are much more important.

[1] J. W. Tyrrell: Across the Sub-Arctics of Canada, 1894, pp. 98–99.

[2] Preble: N. A. F., No. 27, 1908, p. 214.

mexicanus Linnæus, the typical form. T. l., southern Mexico.

lycaon Schreber, 1776, Säugethiere, pl. 89; the dark brown, eastern forest form. T. l., eastern Canada near Quebec.

nubilus Say, 1823, Long's Exped. Rocky Mountains, I, p. 169; the big gray form of the interior Plains. T. l., near Blair, Washington County, Neb.

occidentalis Richardson, 1829, F. B. A., I, p. 60; the gray form, the largest of all. T. l., Upper Mackenzie Valley.

gigas Townsend, 1850, Journ. Acad. Nat. Sci., Phila., II, p. 75; the big red form of the Puget Sound region. T. l., near Vancouver, Clark County, Wash.

rufus Audubon & Bachman, 1851, Q. N. A., II, p. 240; a small red Wolf. T. l., Texas.

pambasileus Elliott, 1905, Proc. Biol. Soc., Washington, 18, p. 79; the big gray Wolf of the interior of Alaska. T. l., Sushitna River, near Mount McKinley, Alaska.

floridanus Miller, 1912, Proc. Biol. Soc., Washington, 25, p. 95; the small black southern Wolf. T. l., 12 miles south of Palatka, Putnam County, Fla.

tundrarum Miller, 1912, Smiths. Misc. Coll., 59, No. 15, p. 1; the white Wolf of the Arctic regions. T. l., Point Barrow, Alaska.

In general habits they are much alike. The only differences are those imposed by different surroundings and opportunities. Therefore, I shall consider the Big Wolves as one superspecies, but give a separate chapter to the last, the White or Arctic Wolf, because its peculiar surroundings have established some peculiar habits.

Fur

The skin of the Gray-wolf is split open flat like that of a Beaver, while Coyote skins are cased like Fox and Mink. The fur is rich, full, and beautiful. It makes a fine robe, but is not very durable as a rug. It is prime from November 15th to April 15th, and brings from $1.00 to $10.00, according to quality.

At the London annual fur sales held at Lampson's, March, 1906, there were 15,843 Wolf skins disposed of. The highest price realized was 64 shillings ($15.36) each, for two unusually fine blue skins, but 32 shillings ($7.68) each was considered a high price for 5 extra large fine skins of ordinary colour; and first-class skins varied, according to size, from 2 shillings (48 cents) to 30 shillings ($7.20).

PLATE XLV.—BLANCA'S HEAD. LIFE STUDY, 1894

PLATE XLVI.—GRAY-WOLF

Drawn by E. T. Seton, in 1892, for *Forest and Stream*, and reproduced by courtesy of that publication

During the season 1921–22, in the Dominion of Canada, there were taken 9,451 Wolves, the average value of whose pelts was $10.17.

Wolf Range, with Map

A glance at the map shows that the Big Wolf was found in every part of America north of the tropical region, except the Southwestern States. At first it seems that the absence of water and cover has to do with the exclusion of the species from this region, but there is no lack of water and cover in northern California, and throughout this region we find the Coyote, whose needs are much the same as those of the Wolf, and yet no Big Wolves. One can only state the fact and let future observers explain it. It never was found in Anticosti (W. Cowper: F. & S., June, 1877, p. 300).

Home Range

The home-region of the individual usually corresponds somewhat with the size of the animal. It is probable that the Wolf's home area is larger than that of any other of our non-migratory animals, because it is a large animal, therefore compelled to find much food—a flesh-eater whose food supply is notoriously uncertain, and a swift-footed animal that can travel great distances.

When I lived at Pine Ridge, S. Dak., 1902, Dr. James R. Walker and others told me of an enormous white Wolf that had been living around there for 3 years. It was usually seen within 15 miles of Pine Ridge.

In New Mexico, several Wolves were well known by their individual marks and believed to be permanent residents of a region about 30 miles across. In Dakota, near Medora, was a well-known Wolf called *Mountain Billy;* he was so named because he was always found near a certain mountain called Sentinel Butte. This would limit his range to a radius of a dozen miles.

An extraordinary story of a Wolf is related by Archbishop Taché, of St. Boniface, Man.[3] A large Wolf had escaped with a steel trap and clog on its foot, at Isle à la Crosse, one winter. A month afterward it was killed near Green Lake, 90 miles distant, still dragging the trap—a marvel of endurance; evidence also of a very wide range.

When in the Athabaska Country, 1907, I learned from Ed. Nagel, the trader, about an immense Wolf that ranged near Athabaska Landing in 1886. It used to travel from the Landing to the Sturgeon Creek in about 10 days, and would then work back to the Landing, a distance of 70 miles; this was its regular beat. It was well known by the great size of its track and because there was no other Wolf in that region.

In Feb., 1886, Nagel saw it on the ice (there was 6 inches of snow) of

[3] Esquisse sur le Nordouest, de l'Amérique, 1901 [original edition, 1868], pp. 120–21.

MAP VIII. RANGE OF THE AMERICAN GRAY–WOLF (CANIS MEXICANUS)

By E. T. Seton, with assistance of the Biological Survey, 1923

Originally the Wolf was found throughout the timbered States east of the Rockies, but never in the blank area shown in the west. By the beginning of this century, it had been extirpated in the eastern States and Upper Mississippi Valley; that is, in the area tinted pale gray. Since then the area of extermination has been much extended in the southwest. The Newfoundland records are discussed in the text

Athabaska River, a mile below the Landing; it was chasing a Coyote. The track showed that the race had lasted for about a mile. When Nagel came up, the Coyote was killed and partly devoured. He tried to shoot the Wolf but it ran off. Knowing it would come back, he put the Coyote's body into the river, left a poisoned bait on the spot, and got the Wolf next morning. It was a male, "8 ft. 4 in." from nose to tail (skin). The natives said it had lived there for years, covering the same country.

In Dec., 1906, an Indian named Shirma shot a Wolf near Smith Landing, breaking its hind leg. In the end of February, Murdo Mackay trapped a Wolf with a broken and healed hind leg at a place 40 miles south of Smith Landing. As there is very little shooting done in this district they believe this to have been the same Wolf.

In Feb., 1907, at a place 3 miles west of Smith Landing, a Wolf was trapped by the toes but escaped. In March he was trapped again, at a point beyond Fort Smith, 15 miles from his first trapping, this time by the other foot, and again escaped. He had now lost toes on each foot and was well marked. In the end of March, T. Anderson saw his fresh tracks near a house, 8 miles north of Fort Smith. He was shot at Fort Smith about the last of May of the same year.

Enos A. Mills says of the Wolves: "They spend their life in one locality. This has a diameter of 15 or 20 miles. To a certain extent, its area and form are dependent on the food supply and the topography. One Wolf that I know of had a home range that measured 40 by 10 miles."[4]

It is the opinion of all hunters whom I have consulted, that the summer range of a Gray-wolf is less than 20 miles across. In winter, however, it may be doubled by the scarcity of food, but at all times there is a region that it recognizes as home. Yet the great Custer Wolf, as will be seen later, had a known range of 40 by 65 miles.

Unlike the Deer, the Wolf, so far as known, does not have two home-regions, one for summer and another, entirely distinct, to which it migrates for the winter; *i. e.*, the Gray-wolf is a wide ranger but non-migratory.

Haunts

As one views and considers the vast continental range of the Gray-wolf, one realizes that it is equally at home in the semi-tropics of lowland Texas and on the rugged islands of the Polar Sea. It is found everywhere within the territory marked—open plains, dense forests, rolling uplands, or matted cane-brakes—competent and triumphant, except in the water, on the thirsty, burning desert of the Southwest, and among the wind-swept peaks of Goatland.

[4] Watched, p. 155.

Ancient Numbers

The map shows that in primitive times the Wolf ranged over about 7,000,000 square miles, the widest range in North America of any large land mammal. All of Canada and Alaska and all of the United States, except California and Nevada, were well supplied with Wolves; but not in equal distribution. Wolves were certainly most numerous in the region where their food most abounded, that is, the Buffalo Plains of the West, the Deer-teeming forests of the Mississippi Valley, and the middle states of the Atlantic seaboard—the central and temperate regions of the range, its great heart.

The ordinary Wolf litter, as will be seen later, is 7 or 8. The natural enemies that prey on the cubs are eagles, parasites, disease, and last and chiefest, winter famine, which starves all and drives the stronger to devour the weaker, especially in the northlands of deep snow. The average number to leave the den with the mother is probably 5. The winter bands which have been noticed are usually mother, father, and 3 or 4 young. In the late winter, when the parents leave them, it is doubtful whether there is usually more than one cub surviving of the brood; and against these the warfare of man is most effective. But the young do not breed until their second year; this reduces the percentage of increase by nearly one half. Yet it seems that, given food enough for the winter, the Wolves can add 20 per cent. to their number every year, and will do so unless in some way destroyed. Therefore, in regions of abundant food, such as the Cattle country, I argue that the Wolves can stand an annual drain of 20 per cent. by man; and 30 or more per cent. will make a steady diminution—which figures I use in calculating the Wolf population.

When Audubon went on his voyage up the Missouri in 1843, he found White Wolves "extremely abundant. . . . Some days while ascending the river, we saw from 12 to 25 Wolves."[5]

South Manitoba was part of this well-populated region, for it also was Buffalo country. In the early days when the Buffalo swarmed on the Red and Assiniboine rivers, there were hundreds, possibly thousands, of Gray-wolves in Manitoba. Alexander Henry writes, Oct. 4, 1799 [Junction of Park and Red rivers], "Wolves are very numerous. They go in large

[5]Q. N. A., II, p. 159.

droves and keep up a terrible howling day and night,"[6] and his fur reports of the region give: 1800–01, 204 Wolf skins; the following years they numbered, 256, 801, 360, 690, 862, 420, and 68. These, however, included both Gray- and Prairie-wolves or Coyotes, probably equally divided, because Coyotes were scarcely worth marketing then, and most were from Pembina Hills. This gives in round numbers 250 Gray-wolves each year from the Pembina region, which is about 40 or 50 by 60 miles, or 2,500 square miles. There were other traders in the region, and Wolf skins were not much sought after, so that the actual kill was much larger than the skins would seem to show. There were at least double as many Wolves killed in the region as are shown by the trade returns, or roughly, 1 for every 5 square miles. But they could stand the drain, which I take it shows that the number killed was less than 20 per cent. of the total, making it possible that in this populous region there was a Gray-wolf to every $2\frac{1}{2}$ square miles.

In the East, we have one or two helpful records. Dr. W. J. McKnight gives the history of George Smith, a noted Pennsylvanian hunter, born 1827, died 1901 at the age of 74, and says:

"It was in Elk County, Pa., that he did some of his most effective hunting; and it was here that he killed 150 Deer, 13 Bears, and 13 Wolves in one year.

"The following is a record of the game he killed during his lifetime:

"14 Panthers, 500 Bear, 30 Elk, 3,000 Deer, 500 Catamounts, 500 Wolves, and 600 Wildcats. He had killed 7 Deer in a day and as many as 5 Bears in a day."[7]

How many such hunters there were we can only guess. In the best hunting grounds of the Northwest, a hunter to every township (36 square miles) was considered about all it would stand, so that Pennsylvania with its 45,000 square miles, might have 1,000 such hunters, probably more, for the State of Ohio assembled 50,000 Squirrel-hunters for its army in 1862. If, then, George Smith could kill 500 Wolves in his 50 years of hunting, 1,000 such hunters might easily kill 500,000 Wolves in Pennsylvania at the rate of 10,000 per annum. This slowly cleared them out, so must have been over 20 per cent. of their number, and might argue a total Wolf population of 40,000 in Pennsylvania, or roughly one Wolf to every square mile.

Corroborative evidence is afforded by items from the Adirondacks, a region much less thickly populated with game of all kinds. These are taken from "Trappers of New York," by J. R. Simms, 1850, p. 271: Thomas Meacham of the town of Hopkinton, St. Lawrence County, N. Y., died a few

[6] Journ., p. 112.

[7] Forest & Stream, Jan. 17, 1914, p. 94.

weeks ago, according to St. Lawrence *Republican* of Jan., 1850. "He kept an exact account of the game killed by him which amounts to the following: number of Wolves, 214; Panthers, 77; Bears, 219; Deer, 2,550."

In the same work it is stated that Nathaniel Foster settled in Herkimer County, N. Y. . . . because of its abundant game. He is believed to have killed more game than any other man in the State in the same period: "76 Deer in one season; 96 Bears in 3 seasons; 25 Wolves in one year" (p. 176). On p. 177, it states that one year when a liberal bounty was paid on Wolves he got $1,250. If it was all Wolf money this represents 300 Wolves, as the bounty was 20 shillings a head (p. 147).

Greatly reduced though their numbers are in America to-day, "from 1901 to 1905, both years inclusive, 498,000 Wolves [pelts] were taken in Canada and the United States."[8] If half a million pelts were secured, it certainly meant the destruction of 1,000,000 Wolves, for old and young are killed at all seasons. This means 200,000 a year were killed then, but it seemed to be slowly reducing the numbers, therefore was more than 20 per cent., which might argue less than 800,000 Wolves on the range at that time.

An important item is contributed by the editor of *Forest & Stream*, Oct. 9, 1909, p. 576. He states that 1,581 Wolves were taken in Minnesota during the 4 months ending Oct. 1, 1909. That State has in round numbers 80,000 square miles. Carlton County headed the list with 153 Wolves and 80 cubs. This county has 856 square miles. The Wolf population cannot stand this drain; therefore, more than 20 per cent. are being taken, but the species is not disappearing rapidly, so that I believe the 233 taken in Carlton is about one half, or represents a Wolf population of 1 to 2 square miles. But we know that Wolves are far from being in primitive numbers in Carlton County, so that the Pennsylvania estimate of 1 to the square mile is, if anything, too low.

We have figures referring to Wyoming that help us in getting an estimate of the Wolf population in primitive days.

R. M. Allen, the manager of the Ames Cattle Company (Nebraska), writing to *Recreation*, Sept., 1897, p. 207, says his range is the northeast part of Crook County, Wyo. (5,435 square miles). Since the spring of 1895, they have killed on it about 500 Gray-wolves, and they seem as numerous as ever. This argues at least 1,250 Wolves in that county, or 1 to every 4 square miles. Only half of the State is equally good Cattle (and Wolf) country; therefore, at this rate, it might have 10,000 Gray-wolves.

[8] G. W. Bartlett of Algonquin Park: The Menace of the Timber Wolf, Toronto Saturday Night, Aug. 11, 1917.

Emerson Carney states[9] that Wyoming paid bounties on 4,281 Gray-wolves during the years 1897 and 1898; that is, 2,140 each year. Since they continued numerous, this presupposes a minimum population of 8,000 in the State at that time.

Wyoming paid bounties for the killing of 20,819 Wolves in the 11 years prior to 1908.[10] As at least a half of those killed are not found, we may claim that 40,000 Wolves were killed, or 3,600 each year. Since their numbers bore the drain very well, it would prove the existence of at least 12,000 or 15,000 Gray-wolves in that State alone, with its 97,000 square miles of territory.

Vernon Bailey's investigations cited above (pp. 8 and 9) showed that in the Cattle ranges of the Wind River country, Wyoming, where Wolves were fairly numerous, he found 20 breeding dens in use within a space of 100 miles square; that is, 20 families of 10 Wolves each. But this was in poor Wolf country; half of it was mountains. Also it was evident that he found only about half of the Wolf dens, which, with the troops of bachelor Wolves, easily trebled the estimated population of that region, making 600 a safe estimate, at which rate, Wyoming might have had 6,000 Wolves in 1907, and over treble as many in the Buffalo days, or 20,000. Wyoming's extent and conditions are repeated about 30 times on the central Wolf range. This would argue 600,000 Wolves, and at least as many more in the outlying regions, which is 3 times as great, and would give not less than a round 1,000,000 as a fair estimate of the Big Wolves in primitive days. We have already seen reason to believe that in Pennsylvania, the Wolves went as high as one to every square mile. Pennsylvania has 45,000 square miles. The entire Wolf range, as we have seen, is 7,000,000 square miles, therefore 2,000,000 Wolves is a conservative estimate of the original numbers.

[9] Forest & Stream, Feb. 25, 1899, p. 145.

[10] Wolves, p. 10.

Numbers of Wolves To-day

The map shows that the Wolf is totally extinct to-day in Nova Scotia, New Brunswick, Quebec south of the St. Lawrence, Ontario south of Lake Simcoe, all of New England, the Middle Atlantic States, the Ohio Valley, the middle Mississippi country, and the lower Missouri region. That is, it is extinct in the part of its range where formerly it was most numerous. Though this area is barely one fourth of the total, there can be little doubt that it contained at least one half of the Wolf population. In the remaining part, the inevitable process reduced the Wolves by half; that is, the Wolves in the year 1900 were not more than one quarter of their primitive number. Since then they have been very greatly reduced, though in some localities they are holding their own.

Wyoming. "In the upper Green River Valley of Wyoming between the Salt River and Wind River mountains, Wolves were apparently just as numerous in March, 1906, as on a previous trip that I made through the valley 13 years before. Fresh tracks were seen on the snow almost every day, usually of Wolves in pairs, but in one case of a band of 9. Between March 24 and April 21, 1906, 4 dens, containing 32 Wolf pups, were found, with 2 old Wolves at each den; and evidently there were 2 or 3 other dens in the valley."[11]

Arkansas. When I was at Blythesville, Ark., Feb. 6, 1920, I made all possible inquiries among the hunters, and was told that Wolves were still plentiful. Some said there were hundreds in the State; 500 is a guess that was approved.

Missouri. Wolves have reappeared in Central and Southern Missouri, and according to J. S. Ligon, of the Biological Survey, in August, 1923, were "very numerous and in many localities have made Sheep-raising impracticable.[12]

"The capture of 1,723 Wolves is reported from 39 National Forests, which comprise an area of 72,760 square miles. The surrounding country included may amount to as much more, making an area of about 145,520 square miles, to which the reports relate, or about one tenth of the total area inhabited by Wolves in the United States."[13]

[11]Wolves, 1907, p. 8.

[12]The Survey, Nov. 15, 1923, p. 3.

[13]Destruction, p. 5.

Since poison is largely used, the actual kill is about double or 3,000 Wolves. Their numbers are dwindling under this drain; therefore, since their annual increase is only 20 per cent., this must be more than one fifth, but not much, because they are dwindling slowly. Call it 10,000 Wolves, and on the total area 100,000, to which add as many more from Canada and Alaska, giving a Wolf population of 200,000 in 1908.

During the 5 years, July 1, 1915, to June 30, 1920, the Biological Survey reports the killing of 2,846 Wolves in the States west of the 100th meridian, to which must be added 17 in Arkansas and 73 in Oklahoma, a total of 2,936, not including what were poisoned, which would certainly double the number.[14]

In 1918, the reports show that the Wolf was rapidly disappearing. The 1907 killings in the Cattle States, *i. e.*, those west of the 100th meridian, totalled 1,723 (see above), and in 1918 had fallen to one half, or 849.[15] Trapping is carried on more vigorously than ever. The argument from these facts and figures is that in all the Cattle States to-day there are less than 3,000 Gray-wolves. Twenty-five years ago, I estimated the number at 500,000.

In Mexico, it is believed that the Gray-wolf is nearly, if not quite, extinct.

According to Gower Rabbits, "The Wolf is not found all over Newfoundland. For the past 20 years, very few have been reported in scattered localities. More than 20 years ago, 8 Wolves were seen in one bunch near Gaff Topsails It was reported 2 years ago, that 2 were seen in the vicinity of St. Georges, and last winter 2 crossed over the Birchy Lakes going south, and tracks of 2 were seen at the Doctors Hills. None have been reported on this side of Newfoundland for several years. Some years ago, a few were reported between Bonavista Bay on the east coast and Fortune Bay on the south, but none have been reported on the Avalon Peninsula for 40 years."[16] These localities are spotted on the map.

In Nova Scotia, the Wolf is extinct.

In New Brunswick, also, it is reckoned extinct, but a straggler was taken in 1921–22.

In Quebec they are exterminated in the St. Lawrence Valley and southward; but from other parts, according to the Government Reports, a total of 91 were killed in 1921–22.

In southern Ontario, they are exterminated except in the Algonquin Park. During 1911, the "Rangers killed 47 Wolves in Algonquin Park

[14] W. B. Bell: U. S. Dept. Agri. Yearbook, 1920, p. 299.

[15] An. Rep. Biol. Surv., 1918, p. 3.

[16] Personal letter, Nov. 14, 1923, from Secr. G. & I. F. Board, St. John's, Newfoundland.

[1,800 square miles] that were accounted for. Fully as many more must have fallen victims to poison from the amount of bait taken. Two thirds of the number brought in were females."[17]

In Algonquin Park, in 1922, I learn from the Rangers that 75 to 100 Wolves are killed and secured each year, probably as many more destroyed and never found, and yet they continue numerous as ever. This presumes a Wolf population of 600 in the Park; that is, one to each 3 square miles. Nowhere else in timbered Canada are they so numerous, because nowhere else are Deer so abundant. Yet in the vast hinterland of North Ontario 1,151 were killed in 1921–22, according to Government report.

Manitoba. Very rare, except in the North Woods. There in nearly primitive numbers, but never abundant. In 1909, I figured that there were 50 to 100 pairs of Gray-wolves in Manitoba. In 1921–22, the government report gives 2,505 killed, and yet there must be at least as many left.

Saskatchewan has more Wolf country and may have twice as many Wolves. In 1921–22, there were 3,354 killed and still they are numerous.

In the Cattle country of Alberta, where the conditions and population are nearly the same, 1,590 were killed in 1921–22.

In British Columbia that same season, 306 were killed.

This leaves the great hinterland of Alaska, Yukon, Mackenzie, Keewatin, Franklin, Ungava, Labrador, totalling 3,000,000 square miles, in which primitive conditions continue, and in which (omitting Alaska) only 453 were killed in 1921–22.

According to the explorers J. W. Tyrrell, Buffalo Jones, and others, who crossed the Barren-grounds in the '90's, the Wolves appeared in droves, apparently existed in hundreds

The fur reports show that several thousand skins are exported each year without reducing the stock. It would be very conservative indeed if we put the Wolf population of the country north of lat. 49° at 100,000.

The fur returns for 1906 showed that about 50,000 American Wolf pelts were marketed in London, but probably three quarters of these were Coyotes.

According to the official report furnished me by the Commission of National Parks, Dominion of Canada, the Wolves killed in Canada during the seasons 1919–20, 1920–21, and 1921–22, were 10,608, 5,316, and 9,451 respectively, besides about three times as many Coyotes.

These were the Wolves for which bounties were claimed or skins marketed. But it is well known that poison is generally in use and the victims seldom found, so that the kill would surely be double, or 20,000 per annum.

[17] Mark Robinson, Ranger: Forest & Stream, July 6, 1912, p. 10.

So far as can be judged, the Wolves in the North are holding their own. Therefore, not more than 20 per cent. are being killed, which means a Wolf population in Canada of 100,000.

Although probably exterminated in the devastated area that I have arbitrarily left white on the map, we get a surprise from time to time by discovering scouts and prospectors of the species in their one-time ranges, for the Wolf is a far-traveller and possessed of the spirit of enterprise.

There are also odd pairs of Wolves maintaining an existence in rough corners where it is generally supposed that they have been exterminated, so that it is not easy to say which are survivals and which new arrivals.

The Remnants in the United States

Maine. In Maine the Wolf is extinct.

New Hampshire. Prof. C. F. Jackson of New Hampshire College, Durham, N. H., writes: "The last record in my possession of the Timber Wolf is that of a specimen taken in the White Mountains in 1887."[18]

Massachusetts. According to W. P. Eaton, a Wolf was killed at New Marlborough, Mass., Dec. 2, 1918. The species, he says, is coming back into Green Mountain.[19]

New York. In the Adirondacks, where once the Wolf was so plentiful, the last survivor seems to have been the one killed by Reuben Cary, trapper, at Brandreth Lake, Hamilton County, in the November of 1893. The specimen is now in the collection of General E. A. McAlpin at Brandreth Lake. (For details, see later section on "Trapping.")

Bachman says: "We examined a specimen of the White Wolf killed in Erie County, N. Y., about 40 years ago."[20]

The last Wolf of Niagara County, N. Y., was killed near the town of Wilson about 1840, by a party of hunters led by Peter Haner. The specimen is now in the possession of Karl Brong of Lockport, N. Y.

The same winter, a Gray-wolf was killed and Walter Brown killed a black one near Ransomville, N. Y.[21]

Pennsylvania and New Jersey. In 1903, S. N. Rhoads published his "Mammals of Pennsylvania and New Jersey." In this he gave several pages of records dealing with the last Wolves known to have lived in these States, and says (p. 149):

"Wolves were once commonly and uniformly distributed over the en-

[18] Journ. Mamm., Feb., 1922, p. 14.

[19] Harper's Mag., Feb., 1920, p. 342.

[20] Q. N. A., II, p. 161.

[21] Forest & Stream, April 15, 1911, p. 575.

tire limits of the two States. They were apparently exterminated in Pennsylvania within the last 10 or 15 years, but more recent accounts seem to indicate that a remnant of the typical Alleghanian animal may still exist in the mountains separating Westmoreland and Somerset counties, Pa. In New Jersey, they had been exterminated so early, even in the northern wilds, that I can get no data as to the last survivors. They were approximately exterminated in New Jersey in the early decades of the 19th Century. As one was killed in Wayne County, in 1887, being driven from New York State by Dogs, it is quite likely that a stray wanderer may have come from the same sources into the Sussex County mountains, as late as the middle of the century from New York or Pennsylvania."

Any records since 1903, therefore, are of unusual interest

Pennsylvania. The killing of the last Gray-wolf in Pennsylvania is recorded by H. F. Coon, in *Forest & Stream*, June 1, 1907, p. 854. The farmers of Brush Mountain, near Hollidaysburg, had lost 40 or 50 Sheep during the 3 years previous. On the morning of May 13, 1907, Jacob Royer saw what he took for a very big Gray-fox killing a lamb. Assisted by S. C. Long and James R. Moore, he killed the creature and found it a veritable Gray-wolf, an old female. She was very gaunt, weighed about 60 pounds, though 5 feet 5 inches in total length. The specimen is now in the Carnegie Museum at Pittsburgh. Prof. W. E. Clyde Todd vouches for the accuracy of the record.

New Jersey. On June 12, 1920, when at Lake Mashipakong, N. J., I talked with many residents and native sportsmen, with a view to a local list of mammals. Charles Robinson assured me that a year ago, he got a good look at a Wolf of some kind in the woods. By "some kind," he meant either Coyote or Timber-wolf. But such records are increasingly doubtful, since Police Dogs and various hybrids have appeared among us.

Dixieland. The map shows that Wolves are yet found in Florida, Georgia, Alabama, Mississippi, Tennessee, North Carolina, and West Virginia.

The following note shows that the Wolf is still to be reckoned with in some of the oldest settled regions.

"News has been received here to the effect that Wolves have been exceedingly bad near Rayville, La., and several calves and Pigs have been killed by them. W. J. Coleman with 2 packs of trained Dogs went out and hunted down a large Wolf. The hunters in and near Rayville will keep up the hunt until they have destroyed all the Wolves in that section. On account of the Wolves, the farmers have experienced much difficulty in raising Hogs, calves, and chickens."[22]

[22] Forest & Stream, April 8, 1911, p. 534.

When I was at Blythesville, Ark., Feb. 6, 1920, I inquired of the numerous hunters. All agreed that the common Black Wolf is plentiful there even yet.

Tennessee. Benjamin C. Miles writes from Brownsville, Tenn.: "There are several of us who would like an answer through your columns as to whence comes a species of large Gray-wolf which in the last 4 years has taken possession of our river bottoms and seems to have gone to permanent housekeeping. Twenty-five years since the small Black Wolf was exterminated, and now, as though dropping from the sky, comes this gray monster that none of our Dogs can successfully tackle; in fact, for a Dog to leave the pack a few yards in a chase is always fatal. This creature has little fear of man, and renders his range useless as a place to raise stock or Hogs."[23]

North Carolina. I have received a long and detailed account of a she-Wolf that terrorized Sassafras Forks, Granville County, N. C., about 1875. When killed with her brood, it was believed the end of Wolves in that region.

Wisconsin. Lloyd Breck sends to *Forest & Stream* of Aug. 22, 1908 (p. 297), a photo of a 100-pound male Timber-wolf killed 20 miles west of Merrill, Wis., in November, 1907. He also secured the female. Ten or twelve came about his camp on Prairie River.

Michigan. W. B. Mershon of Saginaw, Mich., is responsible for the statement that a big Timber-wolf was killed at a place about 3 miles north of Henderson. He had been raiding Sheep in Saginaw County for 6 weeks. He was killed by John Lottridge, Dec., 1909.[24]

Oregon. In the *Oregon Sportsman* for May, 1914, Stanley G. Jewett gives a long account of Timber-wolves in that State, from which the following is taken:

"From data now available, the range of the Northwestern Timber Wolf (*Canis gigas*) in Oregon is restricted to the west slope of the Cascade Mountains from Clackamas County on the north to Jackson County on the south. No record has been obtained of this species occurring east of the divide in the Cascade Mountains or west of the Willamette Valley. . . . N. W. McMillen [who captured a pair of black Wolves near Three Links Camp on Clackamas River, Feb., 1914] estimates that there are about a dozen Wolves that range over the territory in the vicinity of his winter camp, about 25 miles above Cazadero on the Clackamas River."[25]

[23] Forest & Stream, Aug. 31, 1895, p. 182.

[24] As above, Jan. 1, 1910, p. 17.

[25] As above, July 11, 1914, p. 541.

To this Jewett adds in the *Journal of Mammalogy* (Feb., 1923, p. 54): "On Nov. 2, 1915, a large male of the Cascade Timber-wolf (*Canis gigas*) was shot by Mr. H. W. Fisk in Logan Valley, Grant County, Oregon. The skin, which was of the tawny type, was presented to the State Game Commission during December, 1915, where it was examined by the writer. Logan Valley is a small mountain valley at about 5000 feet altitude in the Blue Mountains, and is surrounded by heavy forests of almost a clear stand of yellow pine. As this is the only known occurrence of this Wolf east of the Cascade Mountains in Oregon, I thought it well to place it on record. *Canis gigas* at present ranges from Indian Creek in Jackson County, Oregon, north to the Clackamas River in the county of the same name, and as far as known only along the west slope of the Cascade Mountains. There are probably not over a hundred of these animals in the State to-day."

Vancouver Island. The real but obscure uncongeniality of the West Coast is further evidenced by the following from J. W. Lowther of Victoria, B. C.:

"I have often wondered why we see so little of the Timber-wolf on Vancouver Island. The amount claimed annually in bounties for their destruction proves that very few are killed. As far as I know, they have no natural enemy and I suppose that they are practically immune from disease. As Deer are pretty plentiful on the island, they should never lack food, so that why they do not increase to be a pest is a mystery to me."[26]

California. A number of cases of Gray-wolf have been reported, but all on investigation turned out to be big specimens of the Mountain Coyote (*Canis latrans lestes*) with one exception. Dr. Joseph Grinnell writes me from the Museum at Berkeley, April 25, 1923: "We have the skull of a veritable Wolf taken within the eastern boundary of California the past winter."

[26] Letter, Dec. 28, 1922.

Marriage Customs

The mating season of Gray-wolves begins about the end of January and may last into the first week of March, differing according to the region; the colder the country is, the later.

In the Algonquin Park near Lake Nipissing it takes place in February and early March. At that time, the Ranger, Mark Robinson, tells me that he has overheard terrific battlings between the males and seen the record of these fights in the snow.

Does the Gray-wolf pair? This is so important in the natural history of monogamy that I give evidence at length.

Ordinary Dogs, we know, are promiscuous, but domesticity is notoriously bad for the morals of animals; here, therefore, the argument of analogy would be unsafe. Dr. Woods Hutchinson, in an important article on "Animal Marriage,"[27] points out the promiscuity of the Dog as anomalous and maintains the superiority of monogamy as an institution. "A monogamous race," he says, "will, in the long run, defeat a polygamous," and then he claims that monogamy is the rule in all the higher animals. Hearne says of the Wolves on the Barren-grounds: "They couple in spring and generally keep in pairs all summer."[28]

Miles Spencer, an observant fur-trader, at Fort George, Hudson Bay, thoroughly conversant with the Wolves of that region, maintained that the male assists the female in caring for the young.[29] The Wolf-hunters in New Mexico tell me that when they find a Wolf's den, *two* old ones are sure to be hovering about, and in January I saw there at least one case of a male being deeply devoted to a certain female. A good father is a good husband among animals. Bailey says: "Men who have made a business of hunting Wolves for the bounty, assert that they are usually able to shoot one or both of the old Wolves at the den by watching the trails, or hiding near the den early in the morning before the Wolves return from the night's round. These statements are fully corroborated by my own experience. While watching dens in Wyoming, I could easily have shot the male who was doing sentinel duty; for although he watched from a high point, from which he

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[27] Contemporary Review, Oct., 1904.

[28] Journey, 1795, p. 362.

[29] A. P. Low: Expl. James Bay, Can. Geol. Surv., 1888, App. III, p. 76 J.

could see a man long before being himself seen, still in his anxiety to decoy me away, he often came within rifle range."[30]

Bud Dalrymple, the Dakota Wolver, testifies that the father is always in attendance, and helps in raising and protecting the young.[31] With abundant evidence, therefore, we may state positively that Wolves always pair, at least for the breeding season.

Life-long Union

How long does this ideal condition last? For that season or for life?

Probably for life. I have several times seen a male and female Wolf together at a time when the sexual passion was dormant; and yet the male showed the female more attention than he would have done had she been simply a smaller male. This points to permanent partnership.

In the London Zoo, at present (Dec., 1904), is a pair of Wolves, officially called "Lobo" and "Blanca." The male is from western Texas, the female from Arizona; they are good, typical examples of the Gray- or Buffalo-wolf of those high plains.

They have been there for 3 years and are supposed to be 5 years old. They bred last year, producing 9 cubs, and this year 8. The father has always been kept away from the young, so it is not known whether or not he has any parental feelings. But at all seasons, the male shows kindly consideration for the female, a permanent feeling of friendship, even when the sex urge is quite dormant. The element of chivalry in this is discussed later. All these facts point to union for life.

D. A. Thornbury, Superintendent of Schools, Grinnell, Ia., writes me thus:

"In the latter part of October or early November, 1886, in Mitchell County, Iowa, while we were hulling corn, my brother and myself saw 2 Gray-wolves come out of the woods. One of them was carrying a dead Cottontail in his mouth. They passed within 50 yards of us, and watched us as they passed. They seemed to know that we had no gun."

The fact that 2 Gray-wolves, *unhungry*, should be travelling together in fall shows a friendly alliance most easily explained by a life attachment between the pair.

There is, however, some evidence for the other view. The Alaskan sled Dogs are known to be domesticated Wolves; all are much mixed with wild Wolf blood; some even are Wolves captured when young. Captain Dick Craine, who spent 9 years among them, owning and handling in that time

[30] Wolves, p. 22.

[31] Gray Wolf, p. 12.

PLATE XLVII.—THE LEADER OF THE PACK
Life study by Ernest Thompson Seton
The property of the State of New York, reproduced by courtesy of Governor C. E. Hughes
Exhibited in Salon of 1895

PLATE XLVIII.—WOLVES

No. 1.—Den of Arctic Wolf near Lake Aylmer, N. W. T., Aug., 1907. Photograph by E. T. Seton
No. 2.—Young Gray-wolves born in Philadelphia Zoo. Photograph by R. D. Carson
Nos. 3, 4, 5 & 6.—Buffalo Wolves (captive). Photographs by E. T. Seton

about 200, tells me that he has several times known a pair of half-Wolf train Dogs to mate and remain together as mates *until the pups were well grown*, after which they parted. Two very marked cases happened at the same time. In these the father took an interest in the pups and the mother allowed him to approach them, but warned all others away. He never saw the father feed the pups, but the mother often did so by disgorging.

From these cases he infers that the Wolves mate for one season, but not for life.

Dr. Woods Hutchinson, in his paper on "Animal Marriage," says: "There is a general impression among field-naturalists and trappers that many of these animals, having once paired, come together again in the succeeding seasons, although they may be widely separated during the intervening part of the year. Indeed, some of them positively declare that the union among Wolves, Foxes, Panthers, Lions, and Seals is practically for life. In few species, however, does it terminate until the expiration of the period required for the young to become able to shift for themselves. In some of these, like certain Wolves, the father practically disappears during the nest period of the young, but joins the family again when the cubs are able to run."[32]

A degree of this latter custom is seen in Foxes, Coyotes, and several other carnivores. It seems that in all these creatures there is a deep-laid instinct to leave the mother quite alone during parturition and until the young are some days, or in some cases weeks, old, after which the father is allowed to rejoin the family. This, it will be remembered, is closely paralleled by the practice of many tribes of human savages.

As a general argument, mating customs are so deeply rooted as to be very uniform in a given family; thus all the true pigeons pair, all the true Deer are polygamous; and every evidence, direct or collateral, I can find on any of the true Dogs, except the case of the Alaskan team Dogs (in domestication), points to perfect and permanent *monogamy as the rule*.

Den

The nursery den is either a natural cave, a hollow log or stump, or a hole in the ground dug out by the parents themselves. Sometimes they enlarge a Badger hole, and in any case the bed is not far from the entrance.

"In the western United States," says Bailey, "Wolves breed mainly in valley and foothill country or in low mountains. For breeding dens they choose, if possible, natural cavities or washed-out hollows on south slopes of rocky or bad-land ridges. There is usually a high point not far from the

[32] Contemporary Review, Oct., 1904, p. 493.

den, where the old male stands guard during the day. In timbered regions Wolves breed in hollow logs or such cavities as can be found."[33]

The Ranger, Mark Robinson, says: "They have no regular dens in these parts [Algonquin Park], a bed being selected in a hollow log or under a root of upturned tree, or in niches in rocks. These places form a home for the little chaps for a few weeks, after which they follow the mother, living upon the carcasses of Deer previously slaughtered."[34]

The Gray-wolf apparently does not line its nest. Roland D. Carson, of the Philadelphia Zoo, writes me concerning those that bred in the gardens:

"The females dug a hole in the earth, but made no attempt at lining the nests, and when hay and other materials were put in it to form a bed, they were promptly thrown out."

As the lining habit is instinctive in the kinds that practice it, we note with interest that many animals are tormented with parasites which harbour and breed among the nest material, so that lining is a dangerous comfort.

The Wolvers of Dakota and the West have given us an insight into the Wolf mind by their efforts to locate Wolf dens.

Bud Dalrymple says: "About the 5th to the 10th of April is a good time to commence to look for Wolf dens. Take a saddle Horse and ride back to the head of the big ravines, or if in the Bad Lands country, go over near the wall and look closely for Wolf tracks. A good place to look for them is along the creek bed or draw, and if you see several tracks leading in the same direction—tracks made at different dates—follow them. They will lead you to a den. You may have to go a mile, or maybe 4 or 6 miles, and you may have to leave your Horse and go on foot in order to get over the Bad Lands buttes. When you get within a quarter of a mile of the den, there will be a beaten trail made by the old Grays, and you will have no trouble in locating the den, unless the ground is very dry and hard. Keep this in mind: When you are following a Wolf trail to a den, she will go in a direct line, regardless of creeks, buttes, etc., and if the trail goes up a ravine and swings around and goes down another one, you may as well stop, as you will find no den."[35] In other words, in going home, the Wolf's course is direct, while on leaving home, she is hunting and winds in all directions.

In the same vein, Bailey says: "Except for the tracks of an occasional pack of bachelor Wolves which are wandering through the country in the breeding season, it is safe to assume that every track either goes to or comes

[33] Destruction, p. 8.

[34] Forest & Stream, July 6, 1912, p. 10.

[35] Gray Wolf, p. 20.

from a den. When a track is found, the direction of the den can often be told by the lay of the land and the time when it was made. Since the Wolves hunt mainly at night, to find the den, a track made in the evening should be followed backward, and one made in the morning, forward. As the tracks approach the den, they often gather into well-worn trails or runways, which become so conspicuous near the den that no mistake can be made as to its location."[36]

Corroborative evidence is found in the following by J. A. Shaw of Binford, Wyo. After a late snowstorm in April, which resulted in about 5 inches of snow, he went out Wolf-trailing with a good foxhound.

"We had gone about 7 miles from the ranch, when we struck the trail of a very large Wolf, and back trailing it for a short distance, I found where the Wolf had lain down. As I have spent about 10 years in this business, this told me that I was going the wrong way. I started in the other direction, and as the going was exceedingly rough, I tied my Horse to a tree and went forward on foot.

"I had trailed the Wolf about a mile when, suddenly, the Dog began to growl and show signs of uneasiness, and at this I began to look closely for the Wolf, and suddenly I came upon the den. It was situated in a rough pile of rocks, facing the south.

"It was now about noon. I stood there quietly for a moment, and then, to my great surprise, the old Wolf came out of the den. She had not seen me yet, and not being over 15 feet from her, I killed her with a shot from a .30 United States Army rifle. The male, hearing the shot, jumped up about 50 yards away, but the ground was so rough that I got only one shot at him. We worked all the afternoon at the den, but did not get to the pups; but the next day we went back and got 5 young ones."[37]

"Now," says Dalrymple, "when you find the den and are sure the pups are born, close up the den at once. If there is no material close at hand to close up the hole, take your vest or coat and hang it in the entrance of the den, so if the old Wolf is in the den she will not come out and get away. Even a handkerchief will keep her from coming out, before dark, anyway. Most of the Wolf dens are large enough so a small man can crawl in them.

. . . . . .

Now, if the old she-Wolf is in the den, she will get as far back as she can: and if the pups are small, you may come to them first, and a sack is a handy thing to put them in. They will not hurt you, even though quite large,

[36] Wolves, p. 24.

[37] Forest & Stream, June 4, 1910, p. 892.

and the old Wolf will not harm you until you wound her, which, most likely, you will have to do, as nine times out of ten she will have her back to you and you will not be able to shoot her in a quick-kill spot, but she will soon back up and turn around with her head toward you; and you had better shoot her quick, for any animal, when crowded in a hole and wounded, is apt to bite. . . .

"If you will hide yourself well near the den and keep a sharp lookout, about sundown or real early in the morning, you may get a shot at one of the old Grays."[38]

The Young

According to all observers, the period of gestation is 63 days in the Gray-wolf, as in most, if not all, of the true Dogs. In the Berlin Zoo, according to Dr. O. von Heinroth, the following have been observed: 62, 64, 66, and 63 days.[39]

The usual date for birth of the young is between March 9 and April 15. The earliest records are as follows from Fontinelle, Wyo.: March 5th, 4 pups about 10 days old, evidently born about February 23rd; another brood March 10th, both in 1908 and recorded by Bailey.[40]

In the National Zoo at Washington, litters have been born on March 23d, 27th, 29th, and April 2nd, 4th, 5th, 6th, and 9th, May 1st, and August 31st.

Those in the London Zoo (parents from Texas) were born March 28th; all the four litters bred in the Philadelphia Zoo were born in March and April, the earliest March 18th, the latest April 19th. Even in the Red River Valley they are born about the same time, as is attested by the notes given later from Henry's "Journal."

The young number from 3 to 13, but are usually 6 or 7, the average being over 7.

In Algonquin Park, Ontario, on April 10, 1908, Henry Callaghan, the Ranger, shot a female Wolf that had in it 5 whelps, all haired and ready for birth. Mark Robinson was present and examined mother and pups.

Blanca, the female in the London Zoo, already described, is credited with having produced 42 pups in 5 litters between 1901 and 1909.[41]

A Wolf-hunter, W. M., writes from Colles, Alberta, that along the boundary line between Montana and Canada, in the spring of 1897, he found

[38] Gray Wolf, pp. 20–21.

[39] Zoöl. Beobachter XLIX Jahrgang, Frankfurt, 1908, p. 16.

[40] Destruction, p. 3.

[41] Forest & Stream, May 8, 1909, p. 732.

6 Gray-wolf dens, with a total of 43 pups, the largest litter 11, the smallest 5.[42]

Vernon Bailey found a total of 32 pups in 4 dens in Wyoming.[43]

The total of these 16 litters, then, is 122, an average of $7\frac{5}{8}$ to each.

When born, the young are blind and almost naked, and, like young Dogs, their eyes are not fully opened until the ninth day.

W. H. Blackburne reports that he has watched several litters in the National Zoo at Washington, and found their eyes opened a little on the seventh day and fully opened on the ninth. Carson says that the only litter of the Wolf pups that he was able to watch closely "did not get their eyes opened till the thirteenth day." Possibly these were prematurely born.

The following from Henry's "Journal" has a bearing on all aspects of the subject before us (pp. 174–75):

[Park River Post on Red River] "April 7, 1801. One of my men brought in 3 Wolves of this year which he had found in a hole in the ground; they sometimes have their young in a hollow log or stump. . . . Another of my men brought in 6 young Wolves he had found in one hole."

Maternal Instinct

"Shortly after birth and long before their eyes were open," says Carson, "the mother-Wolf [in the Philadelphia Zoo] would come to the front of the enclosure with one of her pups in her mouth, sometimes returning for another one or two, but all were never brought out at one time; one was carried about for a while and then returned. This was generally done when the keeper was in the back passage or adjoining cage. Nervousness from fear of harm to her babies seems, in most cases at least, to have been the cause of this habit."[44]

The maternal instincts of the she-Wolf are of a high order. Carson, above quoted, remarks:

"We have no instance of a Gray-wolf killing or eating her young, but Prairie-wolves in our Zoo have not only killed their young, but eaten them when they have died from other causes."

When I was at Sidney, Ohio, March, 1902, I met an old hunter who related a curious and interesting story that illustrates the motherliness of the she-Wolf. About 20 years before, when he lived in Wisconsin, a bounty of ten dollars each was put on Gray-wolves, and he spent a good deal of time hunting them. One day he saw a Wolf come to the river to drink. He shot

[42] Recreation, July, 1898, p. 45.

[43] Wolves, p. 8.

[44] Letter.

and killed it, then found that it was a female suckling young. He searched many days for the nest but could not find it.

Two weeks later he shot another female Wolf coming out of a hollow log. She also was suckling young. He crawled into the log and found 13 Wolf pups of two different sizes—6 very small ones, 7 much larger. She had but 6 teats in commission, so he concluded that this she-Wolf had rescued the young of the first female he had shot.

The Good Father Wolf

"The old male helps feed the pups," says Dalrymple, "same as the female, while the pups are small, but I think he does not go in the den. I have killed several old females in dens, but have never found an old male Wolf in a den, though I have shot and also caught them close to a den."[45]

Most Wolvers find that the father Wolf has a special lookout, whence he can at all times keep watch and ward over the family.

A touching incident that shows the loyal devotion of the male at the most trying time, *i. e.*, near younging time, is thus recorded by the hunter quoted above:

A "year ago last spring a pair of Wolves fell into my traps, and the female Wolf had her litter of pups after getting in the trap."[46]

A further evidence of the father's interest in the young is seen in this trapper stratagem:

"A very good way to catch either the male or female Wolf is to take a dead Wolf pup, stake it down some 50 or 75 yards from the den and set a No. 4, or still better, a 4½ Wolf trap, on each side about 2 feet away from the pup. I have always had good luck in getting the old Wolf this way. The most trouble in this case is the turkey buzzard. They are regular dead animal scavengers, and will likely get in the trap before the Wolf comes around."[47]

What a commentary is invited by all this! Our only chance of trapping and destroying these wonderful creatures is by playing on their noblest emotions—love of their young or devotion to each other.

Growth of Young

The young ones of the Philadelphia Zoo would whine like puppies as soon as they were born, and the mother would answer and call them in the same manner.

[45] Gray Wolf, p. 12.

[46] As above, p. 24.

[47] As above, p. 12.

As soon as they could see, they began to play together like the young of the domestic Dog. All their growth-stimulating exercise comes to them in the form of play.

At from 3 to 4 weeks, according to their vigour, all would come out daily, never at night, and sit or play in the sun about the door of the den, but were ever ready to scurry in again at the slightest alarm. According to Lee Hampleman, my Rocky Mountain guide, the young ones in Colorado first began to follow the mother for short distances from the den in June when they were about 3 months old, though farther north they might not begin this life for another month.

Feeding the Young

The question how they are fed has been much discussed; and sifting down the evidence of many observers, it may be considered sure that they are simply suckled for about 6 weeks, during which time the father has little to do with them. Now the mother begins to *disgorge* solid food for them. Many observers say that they have watched closely but never saw anything of this. Carson, however, states positively and conclusively:

"At 5 or 6 weeks they begin to eat the food disgorged for them by the mother, and later, when they wanted food of this kind, they would jump at her mouth, sometimes several at once, until she supplied them."[48]

The father soon becomes active, not disgorging, so far as we know, but bringing fresh game to the den. On this point D. A. Thornbury, Superintendent of Schools, Grinnell, Ia., also writes me: "My father has many times found in the mouth of the hole in which he took some young Wolves, bodies of Rabbits and chickens, and in one instance he took from the hole the partly eaten body of a lamb."

Of the above-mentioned brood of 8 young Wolves in the London Zoo, 4 were raised by a collie foster mother, and they became very tame as well as unusually fine specimens. The rest were left with the mother; 2 died. The others grew up, but were weaklings and very shy and wild. The collie was fed on dog-biscuit, the mother Wolf on raw meat, the only food she would touch.

"After the collie-raised 4 were put in a paddock by themselves, they also grew wild and timid, except one, which for some unknown cause remained tractable and dog-like. This is a most interesting case of individual variation in temperament, and suggests how breeds of domestic Dogs have

[48] Personal letter.

been brought to their present condition of tameness by breeding from stock artificially selected for that attribute."[49]

"One was sold to a member of the Society, who lives in the country, where the young Wolf has all the liberty of a Dog. It follows a carriage, attends garden parties, and is a favourite with children. It is larger than either of its parents."[50]

The following year, Doctor Drewitt wrote me, June 25, 1905: "Blanca has had another litter of puppies, and, as usual, those that were brought up by a collie wet-nurse were tame, and those which were nursed by the mother, wild. All the puppies had lead-coloured iris."

Their great diversity of disposition is early shown. Some are meek and playful as puppies, some are wild and fierce from the beginning.

"One litter of 8 pups taken from a cavity under a large boulder when they were about 6 weeks old, fought as fiercely as their strength and puppy teeth would admit, but they could not cut through my buckskin glove. There is no real danger from the young while they are still in the dens, unless blood poisoning should result from a scratch of their teeth.[51]

Miles Spencer says that the young are suckled for 2 months after birth in the region about Hudson Bay.[52]

Carson, however, writes me: "It is probable they would nurse for 5 or 6 months, but as a rule we took them from the mother before they were entirely weaned. The weaning was very gradual, and toward the last the mother would snap when they attempted to suckle her."

Enemies of the Young

At this time the only enemies that the young Wolves have to fear are eagles, man, insects, and disease. Eagles very often pick up the youngsters as they play around the den door; man destroys the mother, and digs out the pups if he can locate the den; parasites, insects, and disease also are to be dreaded, but of course, winter famine is their direst scourge.

Hearne makes some remarks which show the Northern Indians and the Wolves on a very friendly footing.

The Wolves, he says, "always burrow underground to bring forth their young; and though it is natural to suppose them very fierce at those times, yet I have frequently seen the Indians go to their dens and take out the young ones and play with them. I never knew a Northern Indian hurt one

[49] R. I. Pocock in letter.

[50] Dr. J. D. Drewitt in letter.

[51] Wolves, p. 24.

[52] A. P. Low: Expl. James Bay, Can. Geol Surv., 1888, App. III, p. 76 J.

PLATE XLIX.—SLEEPING WOLF
Oil painting by E. T. Seton. Exhibited in Paris Salon, 1891

PLATE L.—LIFE STUDIES OF WOLVES

By E. T. Seton. That in the centre and the two toward the right-hand upper corner are Gray-Wolves from the Buffalo Plains. The rest are from Europe

of them; on the contrary, they always put them carefully into the den again; and I have sometimes seen them paint the faces of the young Wolves with vermilion or red ochre."[53]

In August the young are so far grown that they begin to follow the mother about in her hunting expeditions, and the den is abandoned. By this time the doorway is littered with the bones, fur, and feathers of the game brought home by the parents.

Education of the Young

The education of the cubs now begins in earnest. The chief means is example. Whether consciously or not, on the part of the teacher or of the class, there can be no doubt that it is by seeing the mother do, or not do, that the little ones learn much that is necessary to their success in life. Thus she inspires them with terror of a trap by showing her own terror of it; no matter whether conscious or unconscious, *this is teaching*. The same is true, I suppose, of all the ideas that modern Wolves have; that is, the ideas so recent that they have not yet had time to become ingrained as instinct.

A glimpse of young Wolves in their training is afforded by the following incident told me by Guide Stotz of Algonquin Park, Aug. 5, 1922. When tramping along the railroad at sundown east of Joe Lake, not far from Camp Ahmek, near milepost 307, on July 29, 1922, he caught sight of a band of 12 Wolves and heard others. He saw them pull down a Deer at the edge of the bush. Then they broke into a terrific howling. Stotz was so alarmed that he climbed one of the low telegraph poles, but they did not come near, so he came down and went on. He thinks there were 16 Wolves, but Mark Robinson, who went later and examined the signs, etc., thinks it was the work of but one family, composed probably of father, mother, and 5 or 6 whelps.

Further illustrating their travels under guidance of the mother is the following by Bud Dalrymple, though in this case, alas, the mother proved to be tragically unwise.

"Several years ago," he says, "I caught 2 Wolves in one setting of traps at the same time, and these traps were set on a trail not over 2 feet apart. This was in October, and one was an old female, the other a spring pup, although full grown."[54]

Carson says: "They are still puppy-like at one year, and hardly full grown until 18 months old; even then they did not have the fully adult look. The females in the Philadelphia Zoo did not come in heat till they were 2

[53] Journey, pp. 362–63.

[54] Gray Wolf, p. 24.

years old." It is known that they do not breed till they are 2 years old. That is, they are like Dogs in this respect.

This agrees with observations made on the Wolves in the London Zoo. It is likely, therefore, that the Gray-wolf is not fully mature until its third year. Thenceforth the female breeds once each year while in vigour; that is, probably, till her ninth or tenth year.

Age

A Dog is supposed to be old and useless at 10 years. Ulysses' Dog which attained to 20 has been the talk of ages. A Wolf, being a wild Dog, should have about the same allotted span. That this is the case, the following records in the National Zoo at Washington show:

"A male Gray-wolf (*Canis nubilus*), born in the Park, March 29, 1905, died at an age of 16 years, 3 months and 5 days, on July 4, 1921. . . . A female Woodhouse's Wolf (*Canis frustror*), born in the Park April 17, 1911, died Jan. 7, 1922, at an age of 10 years, 8 months and 21 days."[55]

Wolf Packs

There can be little doubt that the ordinary Wolf pack seen in summer and autumn is merely the family under guidance of the parents, though on rare occasions, two families will unite for a time.

The most I ever saw in a band was 5. This was in northern New Mexico, Jan., 1894. The most I ever heard of in a band was 32. This was in the same region and was doubtless a winter asemblage of 4 or 5 families.

Dalrymple says: "I have seen 11 in one bunch, and I once saw where 14 of them went right by camp, their tracks in the snow showing just how many there were."[56]

Ranger Mark Robinson of Algonquin Park says that the Wolves are not often in packs, any more than the family group. But on Dec. 22, 1908, he saw a pack of 14 Wolves, and in March, 1918, he came on the tracks of 22 that were travelling together.

On May 23, 1921, he heard a mother Wolf and her cubs pull down a Deer in a swamp near Canoe Lake. He is quite sure of it, though he could not get near enough to see in the thick alders. He heard the mother's howls and the little yelps of the cubs, as well as the "blats" of the Deer. This must have been a very early litter, as they do not usually run with the mother till late summer; or possibly a bachelor pack.

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[55] Ann. Rep. Smiths. Inst., 1922, p. 93.

[56] Gray Wolf, p. 22.

As already noted, the Wolf does not breed till it is 2 years old. Consequently, bands of immature, unmated Wolves are sometimes seen in spring and summer. These are known as the bachelor packs.

Sociability

The fact that these foot-loose, carefree wanderers keep together is an evidence of sociability. Indeed, the Wolves are the most sociable beasts of prey. Not only do they gather in bands, but they arrange to render each other assistance, which is the most important test of sociability.

The large packs are apparently formed in winter only. I think, further, that this species is not gregarious in the sense that the Antelope and Wapiti are. The packs are probably temporary associations of personal acquaintances, for some temporary purpose, or passing reason, such as food-question or mating instinct. As soon as this is settled, they scatter. No doubt these same individuals are ready to reunite as soon as a new occasion requires it, and would resent the presence of a total stranger. This I take to be true sociability.

An instance in point was related to me by Gordon M. Wright of Carberry, Man. During the winter of 1865, he was logging at Sturgeon Lake, Ont. One Sunday he and some companions strolled out on the ice of the lake to look at the logs there. They heard the hunting cry of Wolves, then a Deer (a female) darted from the woods to the open ice. Her sides were heaving, her tongue out, and her legs cut with the slight crust on the snow. Evidently she was hard pressed. She was coming toward them but one of the men gave a shout which caused her to sheer off. A minute later, 6 Timber-wolves appeared galloping on her trail, heads low, tails horizontal, and howling continuously. They were uttering their hunting cry, but as soon as they saw the Deer, they broke into a louder, different note, left the trail, and made straight for her. Five of the Wolves were abreast, and one that seemed much darker was behind. Within half a mile they overtook her and pulled her down; all seemed to seize her at once. For a few moments she bleated like a Sheep in distress; after that the only sound was the snarling and crunching of the Wolves as they feasted. Within 15 minutes, nothing was left of the Deer but hair and some of the larger bones, and the Wolves fighting among themselves for even these. Then they scattered, each going a quarter of a mile or so, no two in the same direction, and those that remained in view curled up there on the open lake to sleep. This happened about 10 o'clock in the morning within 300 yards of several witnesses.

As will be seen in the section on "Playfulness," the Wolf has some social amusements.

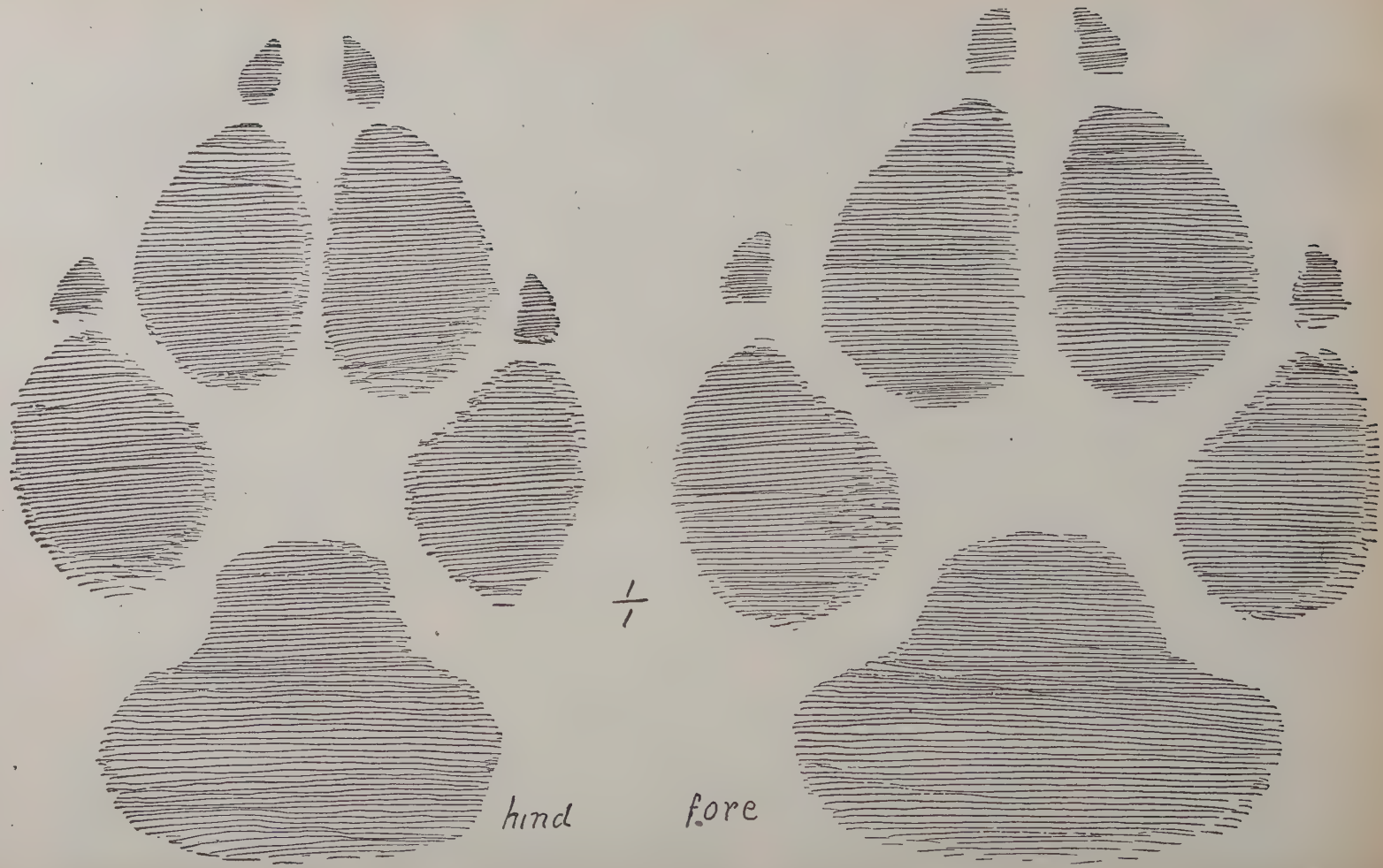

PLATE LIII—TRACKS OF LARGE GRAY-WOLF (LIFE SIZE)

The Wolf Howl

The usual cry of the Wolf is a long smooth howl. It is quite musical, though decidedly eerie when heard in the woods at night. I cannot distinguish it from the howl of a large Dog. Its beginning is also much like the hoot of a horned owl. This is usually the "muster" or "rallying cry"—the intimation of the Wolf to his friends that he has found game too strong for him to manage alone. It is the call commonly heard at night about the settlers' cabins and it never fails to affect me personally with a peculiar prickling in the scalp that I doubt not is a racial inheritance from the Stone Age.

A second sound is a higher pitched howl, vibrating on two notes. This may be styled the "hunting song"; it corresponds exactly with the full cry of a pack of Hounds on the hot scent.

A third is a combination of a short bark and a howl. It seems to mean the "closing in" for a finish. There are several others that I have often heard, but cannot comprehend. Some of my hunting friends claim that they can distinguish the calls of the she-Wolf to her mate and her young; the call of the young to their mothers, etc. I doubt not these signals are used, just as surely as Dogs use corresponding sounds among themselves, but I have not been able to distinguish them. The whining used by the young while still in the nest has already been spoken of, as well as the mother's similar response.

The veteran scout, "Yellowstone Kelly" (Capt. Luther S. Kelly), writes concerning the Wolf howl:

"It is in stormy weather that the Wolf appears to be in his element; the unearthly chorus, ringing all the changes of the gamut, startles the hunter in camp or the traveller by night. A Wolf delights in getting on some point of rock in a storm and howling in unison with the blast that sweeps through the gulches or canyons of the foothills. The wild Dogs that infest Indian camps howl in chorus like the Wolves, and it requires an expert to distinguish between the two."[57]

When I asked the old Plainsman, L. A. Huffman, of Miles City, Mont., to what extent Wolves use the odour-posts for far signalling, he replied:

"I have never heard of or seen anything to lead me to the conclusion that Wolves signal to one another across country other than vocally. The howl of a Gray-wolf can be heard a long distance.

"I once knew an old she-Wolf to carry a tallow ball—containing a big dose of strychnine—4 to 6 miles, laying it down in the snow every now and

[57] Forest & Stream, Feb. 20, 1897, p. 145.

again, while she bayed loud and long. She was joined by 2 full-grown males at different points. The trio travelled a mile together and then each ate enough of the bait (the ball was only an inch and a half in diameter) to kill, as was evidenced by the 3 bodies found the next morning within 50 feet of each other. They must have known it was loaded, but it would seem the temptation to eat was so strong they finally concluded to take the chances. They played for small stakes and lost."[58]

Mark Robinson in *Forest & Stream*, July 6, 1912, p. 10, says: "In this land of lakes and streams, if a Wolf howled, all the Deer would be ready to take refuge in the water; consequently the Wolf in these parts is the most skilful still-hunter. When their quarry is being pulled down and killed, they howl and growl much after the manner of many Dogs. Should a Deer escape into the water after a hard chase, the young Wolves will howl with disappointment for a few moments over their great loss, then all is silent.

"Wolves do a great deal of howling during the mating season in early spring months. During this period the males fight fiercely with each other. We have found where they have fought and moved on with their band, leaving a trail of blood for a mile or more. We have followed these trails, fully expecting to find them disabled, but they always appear to travel on as though nothing had occurred."

William Dicer of Albion, Mich., writes: "From what I have observed, I believe it true that Wolves can signal, one to another. Last fall my partner and I were in Minnesota. An hour or so before sundown one day, we heard a Wolf howl. The sound continued for a while and finally came toward us. My partner answered with a good imitation howl; but the Wolf retreated in the direction from which it had come. It was getting late, and we returned to camp. There we could still hear the Wolf calling. For some time, it obtained no reply; but at last we heard, from the opposite side of our camp, the answering howls of a half dozen or more Wolves. The sounds passed us, going in the direction from whence we heard the first call. From the difference in the tone of the howls, we concluded that the first came from an old she-Wolf, and the others from a party of young whom she had been calling.

"At another time I was setting traps on the ice in a pond. Five Wolves came out of the woods to the pond. When they saw me, they scattered in different directions. I fired 3 shots after them, but they were far away and running rapidly, and I failed to kill any. There was one large Wolf and 4 smaller ones; probably an old she-Wolf and her pups. Soon after the

[58] Recreation, Oct., 1897, p. 295.

large one reached the woods, she howled, evidently calling the others to her. In this case, I did not hear the young Wolves answer."[59]

The old-timer, Lew Wilmot, has given a lot of interesting details, showing how he decoyed Wolves within revolver shot by a clever imitation of the call-howl. His field of activity was the forests of Washington on the Clearwater. The time was about May 1st, and in each case it was a very big Wolf, apparently a male, that followed the siren-call to destruction. The chapter, though replete with woodsy detail, is too long for reproduction here.[60]

How They Spread the News

Besides these sounds as a means of intercommunication, Wolves use example, already set forth, and scents.

The scent method of communicating ideas I made the subject of an article in *Forest & Stream*, Jan. 23, 1897 (pp. 64–65). I reproduce the substance of it here.

Smell-power. It is well known that not only each species of animal, but that each individual has its own peculiar smell, conclusive evidence of which is found in the fact that a good Dog has no difficulty in following his master through a crowd, or keeping to the track of the animal he is hunting, though it be crossed by the tracks of many others.

It is further known that, even though it always retain its individuality, this personal odour varies with the condition of the animal. Thus a Horse smells strong after exercise; Canada grouse and Snowshoe Hares smell of spruce or cedar when they feed on these; a Mink smells different when angry; Dogs in ill-health become malodorous; Deer in rut become offensively strong-smelling; a female animal in rut is recognized afar by the scent.

Odour-glands. In many species additional effect is given to the body-scent by the development of special glands which secrete a strong odour. These glands are usually situated in a part which is habitually brought in contact with the ground or the vegetation. Thus, in a Musk-deer they are on the side of the belly; in the Peccary, on the back; in our common Deer, on the tarsus, between the toes, and in the lachrymal fossa. In some animals, however, the contact with the ground is secured in a different way. The glands are situated within the anal and preputial orifices, so that the natural excretions *in transitu* bear with them the taint which reveals so much to the next passer-by of the same species.

How much of these informational odours is supplied by the protometra,

[59] Recreation, May, 1898, p 381.

[60] Forest & Stream, Mar. 6, 1897, p. 185.

is not yet known. The protometra or protometric gland is, according to Chauveau,[61] a small pouch present in all domestic animals, and sometimes double, which secretes a fluid that is thrown into the urethra through a very small orifice near the *Verumontanum*.

George Fleming, the English editor, adds to this that the gland is not a gland in the ordinary sense of the term, but is certainly the rudiment of the duct that develops into the uterus of the female. It is also called the *prostatic utricle* or *sinus pocularis*.

Wolf wireless. In order that the second animal may find the depot of intelligence quickly, it is necessary that his discovery of the place be not left to chance; and, incredible as it may seem at first sight, there is abundant proof that the whole of a region inhabited by Wolves is laid out in signal stations or intelligence depots. Usually there is one at each mile or less, varying much with the nature of the ground. The marks of these depots, or odour-posts, are various: a stone, a tree, a bush, a Buffalo skull, a post, a mound, or any similar object serves, provided only that it is conspicuous on account of its colour or position; usually it is more or less isolated, or else prominent by being at the crossing of two trails.

Now, a man returning to town goes at once to his hotel or club, glances over the last three or four names on the register, adds his own, then makes a more thorough inspection. And the behaviour of an animal arrived at an odour-post is precisely the same. It approaches, hastily sniffs the post, adds its own odour, then makes a more thorough investigation. The attention that Dogs pay to lamp-posts in town is precisely the same habit, a trifle overdeveloped through idleness, etc., but it will serve to illustrate. I have many times seen a Dog approach the post, sniff, then growl, register, growl again, and, with bristling mane and glowing eyes, scratch fiercely with his hind-feet, and walk off very stiffly, glancing back from time to time.

Again, it is common to see a Dog, after the preliminaries, become keenly interested, trot about the vicinity, and come back again and again to make his own record more evident. At other times one sees the animal, suddenly aroused by the news, take up a recent trail or fly to the next signal post, and so continue in pursuit of whatever it was that was sensed.

Registering. Wolves do precisely the same, but I believe they carry it to a higher pitch, and there can be no doubt that a newly arrived Wolf is quickly aware of the visit that has recently been paid to the signal post—by a personal friend or foe, by a female in search of a mate, a young or old, sick or well, hungry, hunted, or gorged beast. From the trail he learns further

[61] Anatomy of Domestic Animals, English version, p. 969.

the direction whence it came and whither it went. Thus the main items of news essential to his life are obtained by the system of signal posts.

Every man who has hunted or trapped Wolves knows how soon they divine a new campaign against them. The word is passed around (on the odour-posts partly), and the Wolves move to a less troubled neighbourhood, showing a wonderfully effective system of communication among these freebooters.

G. B. Grinnell remarks on this head: "It is said that ranges where Wolves are persistently chased, or where a few have been successfully trapped, will, after a short time, be absolutely deserted by the remaining Wolves, who migrate to some other section of the country where they are less disturbed.

"I heard this autumn of a place in Wyoming called the Settlements which had been troubled for a year or two by Wolves. At length one of the men devoted some time to trapping them, and succeeded in catching 3, and shortly afterward the Wolves disappeared from the neighbourhood, and immediately another region about 30 miles west, where there had before been none, began to be troubled by them. Here they did much harm, killing in a couple of months, besides many range Cattle, 21 cows and calves immediately about the settlers' houses, animals that were kept for milk."[62]

Expression of Scorn. The Wolf, as well as the Dog, has further a habit of urinating or defecating on certain things that appeal to his nose without arousing his appetite. He usually follows this action by vigorously scratching the dust with his hind-feet over and around the object defiled. This treatment is commonly accorded to poisoned baits as well as to traps. I am inclined to think that Wolves have been taken in some of my hidden traps while thus serving them with a Wolf's contempt, and heedlessly going too near while doing so. On other occasions, stones raked into the trap by this scratching have sprung them, and thus they have been fully revealed.

I am satisfied that scorn—that is, hate with superiority—is among the feelings thus expressed, for I once saw the victor in a fight between 2 female Coyotes urinate gleefully again and again on her fallen foe as she crouched in a corner of the cage.

Expression of Anger. A scent-gland that has long been overlooked is on the base of the tail above; its exact place is marked by a dark spot on most of the Dogs. In the Gray-wolf this spot is black, the hairs composing the spot are bristly, and there is no under-fur at the place.

In the Gray-fox chapter I have given a diagram of the tail-glands of various *Canidæ*.

[62] Forest & Stream, Dec. 26, 1896, p. 511.

When a Dog or Wolf, ready to do battle, approaches a stranger, the tail is raised at base and drooped beyond, so that this gland is at the highest point, and the hairs on it are raised. This doubtless allows the escape of more of this scent. It acts as the individual's identification disc.

In play, in battle, or in abject fear, there is no suggestion of this pose of tail. (See Plate LVII.)

Sanitation

In sanitation, Wolves have the habits of ordinary Dogs. They do not bury their dung, but they keep their dens clear of it, and I think that all Wolves, except the helpless cubs, leave the den to urinate.

Diseases

The diseases that have been observed to torment the Gray-wolf are mange, scab, and rabies. I have several times heard of mange removing all of a Wolf's hair except a ridge along the spine, and in consequence have arisen many rumours of strange beasts in the land.

Warburton Pike says: "There was some sort of disease resembling mange among them [Gray-wolves] in the winter of 1889–90, which had the effect of taking off all their hair, and judging from the number of dead that were lying about, must have considerably thinned their numbers."[63]

Henry in his "Journal" (p. 194), makes frequent mention of scab. Thus:

"March 5. A large Wolf came into my tent three times, and always escaped a shot. Next day while hunting, I found him dead about a mile from the Fort; he was very lean and covered with scabs."

Rabies or hydrophobia seems to break out among them at times. Although Wolves do not ordinarily attack man in America, there are one or two cases on record, from the western United States, but there is also evidence that in each case the Wolf was rabid.

Even as early as 1800, it appears to have been considered evidence of madness for a Wolf to attack a man, as Henry thus makes record at Park River:

"Nov. 2. Last night the Wolves were very troublesome; they kept up a terrible howling about the Fort, and even attempted to enter Maymiutch's tent. A large white one came boldly into the door and was advancing toward a young child when he was shot dead. Some of them are very audacious. I have known them to follow people for several days, attempt to seize a person or Dog, and to be kept off only by fire-arms. It does not appear

[63] Barren Ground, N. Canada, 1892, p. 53.

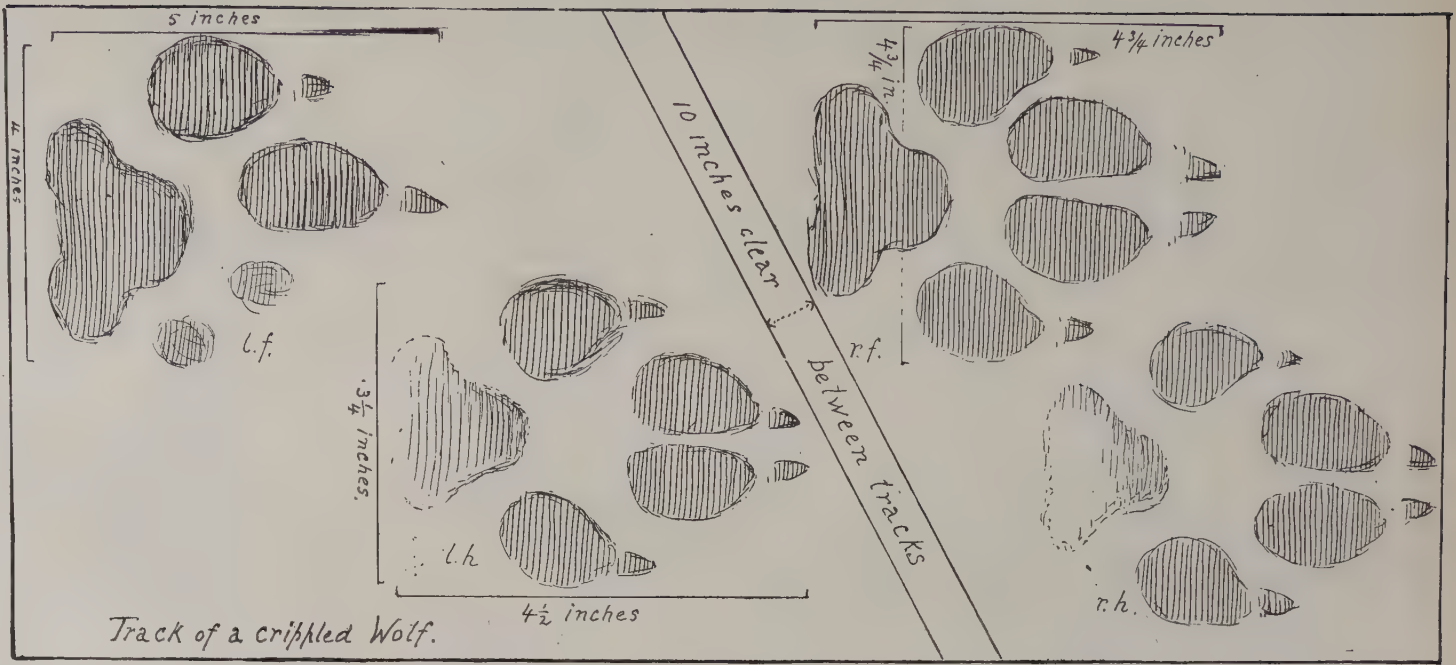

PLATE LIV—Remarkable Wolf track that I found on Athabaska River, near Calling River, Oct. 30, 1907. It had lost the two inner toes of the left hind-foot, and the heel pads of both hind-feet were so faint as to be lost at times, though the toe pads of the same foot were deeply impressed in the mud. I took these signs to mean that the Wolf, an unusually large one, had been caught in a trap, but escaped by leaving behind the missing toes, and was now starved to a skeleton.

that hunger makes them so ferocious, as they have been known to pass carcasses of animals, which they might have eaten to their fill, but they would not touch flesh; their object seeming to be that of biting. The Canadians swear that these are mad Wolves and are much afraid of them."[64]

And again: "April 18, 1810 [on North Saskatchewan]. Another mare was bitten in the nose by a mad Wolf and died the day after, foaming at the mouth and running around distracted."[65]

Charles Aubrey, writing of rabid Wolves in the Old Plains days, says that there were outbreaks of rabies at times among the Buffalo-wolves, and that the Indians were in terror of such.

"Wolves afflicted with rabies," he says, "were most often seen in the months of March and April, although I have seen them quite late in the season of dog-days with all the signs of the dread disease. They went alone, roaming aimlessly about, lacking the motions of a hunting Wolf, trotting along, at intervals making a circling movement, snapping at the tail or hind parts as they made the circle, keeping up a trot and repeating until lost sight of. When killed they showed marks of self-inflicted wounds.

"The Indian Dogs by their actions showed they knew mad Wolves when they came into the camp, by keeping from close contact with them, barking and yelping at them, closing in on them, and again retreating—herding them out of camp.

"An Indian once told me of a well-to-do chief of his people, who owned a band of Horses, all of a mouse colour, with a black stripe down the back. For years he had been breeding them, and he felt much pride in and affection for them. His camp was attacked by a band of mad Wolves, and his band of Horses all died from being bitten. I have not seen a case of rabies on the range of late years, for with the disappearance of the Buffalo went also the great bands of Wolves."[66]

Doping, or the Carrion-craze

The strange habit of doping, so general among the members of the Dog family, is very well marked in the Gray-wolf, as is attested by all who know the creature at home.

Dall De Weese, the well-known sportsman of Canyon City, Colo., contributes a number of observations. He had shot an Elk on White River, Colo., but failed to find it until the meat spoiled. It was then furnishing a feast for a couple of Grizzly-bears.

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[64] Journ., p. 133.

[65] As above, p. 594.

[66] Forest & Stream, Aug. 1, 1908, p. 174.

Coming cautiously back on the third day, hoping for a shot at the Bears, he found another animal. In his own words:

"On creeping to the edge and looking over, I saw a large Timber-wolf at the carcass. . . . I watched him carefully through my glasses, and crawled a little nearer, under cover of a clump of willows. I found he was not eating, but 'lolling' about the carcass. I saw him roll on it repeatedly. He would sit up, lick himself, jump over the carcass, and at it again. . . .

"I levelled my gun for a 250-yards' shot and cut loose. I saw a grayish streak with a funnel end to it, reaching from the carcass to the timber, but haven't seen the Wolf since. I approached the carcass and found the Wolf had not eaten a morsel of it, but had contented himself by rolling in it.

"I have frequently seen Dogs roll in and about the carrion of a Cow or Horse without eating of it. Why they do it I cannot say, unless they have the instinctive desire of all carnivorous animals to linger about flesh, either fresh or carrion; and if it has passed the eatable stage, they roll in it to carry that 'in-stinktiveness' with them."[67]

Dogs, Wolves, and Foxes seem delighted with the opportunity of making themselves reek with stench of the foulest flesh or fish they can find. Although the Dogs are without the personal nicety of Cats, they do have some habits of cleanliness, and spend a certain amount of time in dressing the fur. Who has not seen a Dog bite the burrs out of his coat, or the ice balls from his legs? A Dog or a Wolf which is wounded or bleeding will take the trouble to remove the stains from his fur, and the mystery of his rolling in carrion is unexplained. It cannot be a pleasant smell to him, one would think, because oftentimes it is stuff he will not eat.

E. A. Preble writes me that "A Dog will roll with delight on the spot where a Skunk has been killed, and which retains its odour."

The suggestion that it is based on the sexual instinct does not seem to hold, as female Dogs, as well as males, will do it at any time. I know of no satisfactory explanation.

Speed

The speed of the Wolf is often exaggerated. My impression is that 21 or 22 miles an hour would represent the *highest rate* of an average individual *for one mile*. This is much less than the speed of the Coyote, Jackrabbit, Deer, Antelope, greyhound, or even foxhound; but the Wolf can keep it up longer than most animals. In the "Coyote Life" (p. 388), I have attempted a scale to show the comparative speeds of different animals that

[67] Recreation, Aug., 1897, p. 151.

run on the Plains, giving the rate per hour at the best speed of a representative individual for one mile.

Swimming

The Wolf of Ontario is known to be a good swimmer. W. Lewis Fraser once described to me the antics of a family of Gray-wolves that he saw playing in the water like a lot of water spaniels. This was in Muskoka during the month of September, and they therefore were probably a family and the old ones were teaching the cubs to swim.

Track and Dung

The track of a Wolf cannot be distinguished with certainty from that of a large Dog. (See Plate LIII.)

While size is the chief distinction between Wolf and Coyote tracks, there is also this general difference: the central toes in the Wolf often make a larger track than the outer toes; in the Coyote the outer toes commonly make a larger track than the inner toes. This remark applies only to the track; there seems nothing in the toes themselves to correspond with these proportions.

On Oct. 30, 1907, about 20 miles below Athabaska Landing, on the River, I saw a remarkable Wolf track. It had lost the two inner toes of left front-foot, and the hind-feet pads were so faint as to be lost at times, though the toes were deeply impressed in the mud. I took this to mean he was starved to a skeleton, probably had been in a trap. (See Plate LIV.)

The dung of the Wolf is like that of a Dog. The hair of game animals in it will sometime prove it to be the product of the Wolf.

Food Habits

The diet of this species includes every kind of animal food that he can secure, from Mouse to Moose. Throughout the summer, Mice and such "small Deer" are doubtless the staples. The coming of winter makes a radical change. First, it puts the small game beyond reach; second, it robs the Moose and Deer of the safe refuge afforded by the lakes and rivers and thus brings these great ruminants into the dietary of the Wolves.

Moose-killer

Writing of the Northern species, R. MacFarlane says:

"These Wolves yearly succeed in killing as prey quite a large number of Reindeer and not a few Moose. On one occasion, while travelling upon the ice between Forts Liard and Nelson, in the Mackenzie River District, we came across a big patch of hardpacked snow on the Liard River, where a large buck Moose had evidently been surrounded and no doubt overpowered, after a most gallant fight for life, by perhaps a score of ferocious and cowardly Wolves. A few well-picked bones and the skull were the only relics left. At a short distance, however, we perceived a full-grown Gray-wolf, which was at once shot. It had one of its hindlegs shattered by a kick from the Moose, which so disabled it that it could scarcely crawl. Had its companions not been fully gorged, they would doubtless have fallen upon and eaten it, too."[68]

According to Thomas Anderson, on the Mackenzie, Wolves often kill Moose. In Feb., 1905, he saw on the ice, 34 miles below Providence, the marks where a band of Wolves had pulled down and devoured a Moose.

Edward Nagel, fur-trader at Fort Smith, gives the two following items:

In January, 1907, at Fort Providence, a trapper named Baptiste Bouvier went out to look at his Rabbit snares, when he came on the tracks of a band of half-a-dozen Wolves, evidently attacking a cow Moose. He followed half a mile and found the Moose just killed; they had not begun to eat her. The Wolves ran off and he brought the meat home on his Dog sleigh.

Again, in July, 1906, when Bouvier was resting for lunch at a point 20 miles below Providence, he heard a crashing in the woods and a Moose broke out of the woods and into the water, pursued by one Wolf. He

[68] Mamm. of N. W. Terr., Proc. U. S. Nat. Mus., XXVIII, 1905, pp. 692–93.

shot the Moose but the Wolf escaped. The Wolves commonly disable Moose by hamstringing them.

In the winter (March) of 1907, on Steep-Bank River, E. Robillard says he saw a Wolf running away. Then in the woods, near the bank, he found the body of a yearling cow Moose fresh killed; its head was gone. He followed the back-track a long way and learned that the Wolf was alone, had pursued the Moose for miles, and finally disabled it by partly hamstringing it; but the Moose was not overcome until at last driven over a high place where the fall crippled it. The trail had more and more blood up to the place of the kill. Here it seems the Moose's throat was torn open, and the Wolf had eaten until the head was off. The head was gone, he could not tell where, and did not understand why or how; the "tripes" (entrails) of the Moose were dragged for half a mile across the river.

On the beach of the Athabaska River above Fort McMurray, October 19th, I found many Wolf tracks, one of immense size, $5\frac{1}{2}$ x 5 wide; another smaller one, a female, by the "water mark." There were also many Moose tracks, and the Wolves had killed a Moose, as their dung was full of Moose hair. Not less than 5 Wolves were in this band.

A curious case of Moose-eating, if not Moose-killing, is described by the J. F. Bell Expedition into the Superior National Forest Reserve, Minnesota.

"On Sept. 3, same year [1912], I unexpectedly surprised one of these Wolves, at about 3:30 in the afternoon of a windy day, while it was feeding upon the carcass of an adult cow Moose which lay in a rather narrow but deep part of Isabella River just above a rapids. I was within 50 feet of the animal before it became aware of my approach. Whether the Moose had been accidentally drowned or had been driven into the river by a family of Wolves, and had been harassed and prevented from getting out, I cannot say. Escape up stream was impossible, as the river was crossed by a wall of drift timber. The west bank was lined with huge boulders, and a few yards down stream was a steep, turbulent rapids, making escape also very difficult in those directions, but easy exit was afforded on the east bank.

"Numerous Wolf tracks along the soft edges of both banks in the vicinity, some of which were smaller than others, suggested that perhaps a family with the season's young had been engaged. It had all taken place during a four-days' absence from our main camp within a half mile of which it occurred.

"The lumbar region of the back had been eaten into several inches when the carcass was found, and as the water was much beyond their depth, and the carcass lying on its side, afloat, it was necessary for the animals to

'tread water' when feeding. The first glimpse of the Wolf was obtained while it was struggling and splashing rather energetically in the water beside the back, but unfortunately it detected my presence before it was possible to get in position for a clear view of the interesting process."[69]

A Killer of Deer, etc.

The destruction of game by Wolves is thus discussed in the Wolf Report, 1907, by Bailey:

"Judging from the evidence obtained, Wolves kill far less game in the western United States than either Coyotes or Mountain Lions.

"At Big Piney, Wyo., I examined Wolf dung in probably 50 places around dens and along Wolf trails. In about nine-tenths of the cases, it was composed mainly or entirely of Cattle or Horse hair; in all other cases but one, of Rabbit fur and bones, and in this one case mainly of Antelope hair. A herd of 20 or 30 Antelope wintered about 5 or 6 miles from this den, and the old Wolves frequently visited the herd, but I could find no other evidence that they destroyed Antelope, though I followed Wolf tracks for many miles among the Antelope tracks on the snow. Jackrabbits were killed and eaten along the trails, or brought to the den and eaten near it almost every night, and a half-eaten Cottontail was found in the den with the little pups.

. . . . . .

"About a den near Cora, the numerous deposits of Wolf dung on the crest of the ridge not far away were found to be composed of Horse and Cattle hair, though fresh Elk tracks were abundant over the sidehills on all sides of the den, while Cattle and Horses were then to be found only in the valley, 8 miles distant. Several Jackrabbits had been brought in and eaten, and the old Wolf on her way to the den had laid down her load, evidently a Jackrabbit, gone aside some 20 feet and caught a ruffed grouse, eaten it on the spot, and then resumed her load and her journey to the waiting pups. One small carpal bone in this den may have been from a Deer or small Elk, but no other trace of game was found.

"Talking with hunters and trappers who spend much time in the mountains when the snow is on the ground, brought little positive information on the destruction of Elk or Deer by Wolves. Mr. George Glover, a forest ranger long familiar with the Wind River Mountains in both winter and summer, said that he had found a large Blacktail buck which the Wolves had eaten, but that he suspected it had been previously shot by hunters. In many winters of trapping where Elk were abundant, Mr. Glover has never

[69] Notes on Mamm. Minnesota, Forest & Stream, Oct. 17, 1914, pp. 499–500.

found any evidence that Elk had been killed by Wolves. Coyotes constantly follow the Elk herds, especially in spring when the calves are being born, and probably destroy many of the young, but Wolves apparently do not share this habit. It seems probable, however, that in summer the young of both Elk and Deer suffer to some extent, while the Wolves are among them in the mountains.

"Many Deer are killed by Wolves in the timbered regions of northern Michigan, Wisconsin, and Minnesota, and in parts of Cánada, especially during the winter, when snow is deep and domestic animals are housed. On Grand Island, in Lake Superior, a Gray-wolf appeared on the game preserve of the Cleveland-Cliffs Iron Company in Jan., 1906, when the snow was 2 feet deep. Within the next 30 days, it killed 13 Deer and 1 Caribou, the carcasses of which were found by the party organized to hunt the Wolf."[70]

In Algonquin Park, Ontario, when the great increase of Deer assures the Wolves of a winter supply of food, the latter have been very troublesome. Mark Robinson, the Ranger, says that in the winter of 1921–22, 50 Deer were killed near Camp Ahmek within 1,000 acres—a burnt tract—by 5 or maybe 6 Wolves. One of these, a very large one, killed a Beaver out on the ice in March. The Wolf disembowelled it, but did not eat it, showing that he was well fed.

The swiftest creature on the Plains was the Antelope, but its speed did not always save it from the craft of the Wolf.

Bailey says: "While Wolves are usually found around Antelope herds, they are probably able to kill only the sick, crippled, and young. The following note from Wyoming appeared in the Pinedale *Roundup* of July 4, 1906:

"'While riding on the outside circle with the late round-up, Nelse Jorgensen chanced to see a Wolf making away with a fawn Antelope. He gave chase to the animal, but it succeeded in getting away, never letting loose on its catch.'"[71]

A glimpse of the match of wits against speed is afforded by Enos A. Mills, who writes: "Three Wolves chased a young Antelope through my mountain camp. Though they nearly ran over me, I doubt whether either the Antelope or the Wolves saw me. On they went across the plateau. I hoped that the Antelope might escape; but just before he reached the top of a ridge, I saw a Wolf peering over. The Antelope and the Wolves disappeared on the other side, where I suppose the drifting clouds and steadfast pines again witnessed a common tragedy of the wild."[72]

[70] Wolves, pp. 18–19.

[71] As above, p. 18.

[72] Watched, pp. 142–3.

On another occasion also, he witnessed part of a drama that he thus details: "On the Great Plains in western Nebraska, I saw 2 speeding objects stirring dust on the horizon. It was an Antelope cut off from the flock and pursued by a Wolf. They plunged for a moment or two in a dip of the plains, then reappeared. With glasses on them I saw the pursuing Wolf drop out and another Wolf leap from concealment to relieve him. Following them through glasses as they raced on skyline against a cloud, dropped below eyeline, dashed behind a butte, swiftly the great circle followed brought them within half a mile. In plain view another Wolf leaped into the race. The Antelope was nearly exhausted. The Wolves were leaping at her throat as she disappeared over a ridge. Little puffs of dust showed the advance of pursuer and pursued. These grew dim and I watched for the runners to come up on the skyline. But they never appeared."[73]

Badgers, Kit-foxes, Cottontails, Ground-squirrels, etc., commonly find a safe refuge in the bosom of Mother Earth when the grim Gray-wolf gets over-near, but the poor witless Jackrabbit must trust wholly to his heels—his heels against the Wolf's wits, a poor match, one in which the wits must often win.

G. B. Grinnell writes: "The abundance or scarcity of the Prairie-hare in any district depends almost altogether on the number of Wolves to be found in the same tract of country. Where all the Coyotes or Gray-wolves have been killed or driven off, the Hares exist in great numbers; but where the former are abundant, the latter are seldom seen. We saw none near the Missouri River, where the Buffaloes, and consequently the Wolves, were numerous; but at Camp Baker, where there were scarcely any Wolves, the Hares were very common."[74]

Thus we have seen that every kind of flesh, fish, or carrion that he can get is acceptable food to the Wolf. I find no records of it feeding on fruit, as do Foxes and Coyotes, but Audubon, referring to the Wolves on the Missouri River, says:

"Wolves are said to feed at times, when very hard pressed by hunger, on certain roots which they dig out of the earth with their forepaws, scratching like a common Dog in the ground."[75] And I have several times heard of Wolves hard pressed in winter, filling their bellies with Horse dung gathered on the highway.

Now we come to the great food supply of the Western Wolves to-day, the Cattle of the ranges. Have we not robbed the Gray-wolf of his lawful

[73] Watched, pp. 180–81.

[74] Ludlow's Rep. Reconnaissance Yellowstone Nat. Park, 1876, p. 69.

[75] Q. N. A., II, p. 159.

ancient food, the Buffalo? Have we not declared war on him and his? Do we not harry and hate him? What more reasonable, then, than this—that he should prey upon our gear, nourish himself and his family with the proper spoils of war, the Cattle that we call ours, but which are the property of those who first can get and keep them.

Destroyer of Cattle

When a man goes a-hunting to get food, we call him a pot-hunter and despise him. When a man goes a-hunting for the pleasure of the chase, and piles up a long list of dead, announcing an incredible bag, we laud him as a sportsman.

When a Wolf goes hunting for his food, we hate him for a destroyer, even though he be starving. When he has sufficient food and kills for the love of sport, we have no language strong enough to condemn the destructive monster.

Thus Manly Hardy says: "While usually our carnivorous animals kill to supply their immediate wants, still there are some species which often kill for mere sport, and there are few kinds of which some individuals do not at some time kill wantonly.

"When I was a boy and there were Wolves in Maine, I have known 4 or 5 Wolves to kill over 40 Sheep in a single night in a town near here."[76]

Can we not be honest enough to say that the Wolf is a sportsman, swayed not by vulgar appetite or desire for material possession, but by the love of the game, the joy of the chase? He is a real sport.

Let this be my introduction to a chapter on wholesale slaughter of Cattle by Wolves.

Concerning a band of unusually sportsmanlike Wolves in New Mexico, Bailey writes:

"Judging from my own observations and from what I could learn from the ranchmen, a moderate estimate of the stock killed by each of these 4 Wolves would be a calf or a yearling or a cow every three days, or approximately 100 head of Cattle a year to a Wolf. Counting all as calves, at the very low rate of $10 a head, each Wolf would at this rate cost the ranchmen $1,000 a year. This estimate of $4,000 for the 4 Wolves leaves out of consideration the 5 to 10 hungry offspring of each pair, which would begin to kill stock for themselves in the fall and would continue to do so as long as they lived.

"From the same section of the Gila Reserve, on Sapello Creek, Mr.

[76] Forest & Stream, Mar. 13, 1909, p. 412.

Victor Culberson, president and manager of the G O S Cattle Company, writes under date of June 3, 1906:

"'We estimate the losses on our ranch by Wolves to be at least 10 per cent. Three years ago, while gathering steers to be turned off and holding them in a small pasture, we found one morning 8 yearlings that had been killed during the previous night, and in gathering and disposing of that bunch of about 500 head of Cattle, we had 31 head killed. We have always estimated our losses by Wolves to be the greatest of those from any wild animals. When the Wolves first appeared in this part of the country we paid $50 apiece for 10 of them and considered them cheap at that price. It requires a constant fight to keep them down so as to make the Cattle business at all profitable.'"[77]

Still more pointed evidence of sporty instinct is seen in Enos A. Mills's account: "In North Park, Colo., I saw 2 Wolves pull down 3 two-year-olds in a short time. I watched them through a field glass. One Wolf attacked in front, while the other kept leaping and snapping at the flanks and legs until the animal fell. These three animals were killed in less than half an hour. As they were not eaten, the killing was apparently for the amusement of the Wolves."[78]

The following general summary of Wolf destruction is given by the Biological Survey in 1918:

"The President of the New Mexico College of Agriculture, as a result of a survey of conditions in that State, estimates an annual loss there of 3 per cent. of the Cattle, or 34,000 head, and 165,000 Sheep. A single Wolf killed by one of the bureau hunters in southern New Mexico was reported by stock owners of that vicinity to have killed during the preceding 6 months 150 head of Cattle valued at not less than $5,000. In July, 1917, 2 male Wolves were killed in Wyoming, which in May had destroyed 150 Sheep and 7 colts. Another pair of Wolves killed near Opal, Wyo., were reported to have killed about $4,000 worth of stock a year. Another Wyoming Wolf, trapped in June, 1918, had killed 30 Cattle during the spring. Exceptionally skilful hunters and trappers are detailed to capture these especially destructive animals as rapidly as they are reported, and the success in capturing them has resulted in a great addition to the meat output of the ranges."[79]

Does not all this read like the hunting trips of a German nobleman—a true sportsman?

Finally: "The average destruction by these animals is estimated to

[77] Wolves, pp. 12–13.

[78] Watched, pp. 145–46.

[79] Rep. Biol. Surv., Aug. 29, 1918, p. 3.

be for each Wolf and Mountain Lion about $1,000 worth of live stock annually; each Coyote and Bobcat, $50 worth; and each stock-killing Bear $500 worth."[80]

There is one wild Western creature that has little to fear from the Wolves, that is the Prairie Pony, the Broncho. Twenty years ago, I knew a band of Wild Horses in the Uinta desert country of Utah that lived and prospered without fear of Wolves, though they had a wholesome respect for Mountain Lions.

The following is probably the second chapter of a Wolf's attempt to secure Horse meat. I learned the history from the Hudson's Bay Company traders on the Great Slave River in 1907.

About 1897 a large Wolf appeared near Fort Smith and dogged the Rabbit trappers. Wherever they went to operate, this Wolf found the beat and stole their catch. At length he was poisoned by Sousi Beaulieu, and it was found that his under jaw was broken and stuck out at right angles to the upper; it was quite useless. It is supposed that he was kicked by a Horse. The fall before, a little white-faced sorrel mare belonging to Gerome Beaulieu had come running in with two gashes on her hip as though a Wolf had tried to hamstring her, but she was very active and had known how to take care of herself; probably *she* broke the Wolf's jaw.

The Wolf was a very large one but very poor.

Enos A. Mills gives us a stirring account of a battle between Wolves and a Broncho, in which the tables were more completely turned. He says: "In Montana I once saw a pair of Wolves attack a Broncho. The Horse, which was exceptionally keen-witted and agile, fought the Wolves off successfully for several minutes, and finally smashed a hind-leg of one with a kick. He then became aggressive, and endeavoured to stamp the injured Wolf to death. Under the brave protection of the other Wolf, which fiercely fought the enemy, the disabled one tried to escape; but the Horse landed a kick on this fighter, crippled it, and finally killed both."[81]

Habits in General

The Gray-wolf is one of the shyest of wild animals. I have talked with men who have lived their whole lives in regions where Gray-wolves were far from rare, and yet they have never seen one. They hear them at night, they see their trails and their work in the morning, but never see the animals themselves until they have been trapped or poisoned. Their extreme shyness is partly a modern development, as also is the respect for man, which

[80] W. B. Bell of Biol. Surv.: Yearbook, Dept. Agri., 1920, p. 291.

[81] Watched, pp. 148–49.

now fully possesses every Gray-wolf in the Cattle country. There are many records that show the Wolf to have been a continual danger to mankind in the bow-and-arrow days. There can be no doubt that then man was considered a fair prey—a difficult and wide-awake one, no doubt, but still a creature to be eaten in times of scarcity. Consequently, each winter in America, as in Europe, a number of human beings were killed and devoured by hungry Wolves.

During the last 50 years, however, I cannot find a reliable instance of Wolves killing or even attacking human beings.

The following, related by George Fraser, of Winnipeg, aptly illustrates the disposition of Wolves to-day. In 1886, he was travelling near Whitewater Lake, in southern Manitoba. He came on a Swede who was drawing a long box wagon in which were three or four quarters of beef. Sometimes on the load, and sometimes running around, were 2 large Gray-wolves, feeding on the beef in spite of the Swede's efforts to keep them off with a pitchfork. The driver and the Wolves dodged around the wagon for some time before the man heard Fraser's shouts to stand aside; when he did, Fraser shot both Wolves. The Swede said these two had been a pest for some time, killing his Sheep and one colt. They had never offered violence to man.

I have seen many recent newspaper clippings that recorded harrowing tales of men, women, and children devoured by gruesome packs, but each and all have crumbled into newspaper stories when fully investigated; always, however, with the inevitable exception explained by the fact that the Wolf was rabid.

G. B. Grinnell has had a similar experience, and writes: "For many years I have been looking for an authentic case where a Western Wolf attacked a human being. I think I have found one now in the daughter of old Jim Baker, who still lives down in Colorado, on Snake River. The occurrence happened about 15 years ago, and the attack was made, not because the Wolf was hungry, but because he was cross. The young girl, then 18 years old, was going out at dusk to drive in some milk cows, when she saw sitting just above the trail on the hillside a Gray-wolf. She called at it, and when it did not move, picked up a stone and threw it. The animal came jumping down the hill, caught her by the shoulder, threw her down and tore her badly on the legs and arms. She screamed, and her brother, who happened to be near by, ran up with his gun and killed the Wolf. This was a young Wolf, barely fully grown, and his act it would be hard to explain. The woman still bears the scars of the encounter."[82]

[82] Forest & Stream, Dec. 26, 1896, p. 512.

The question then arises, are the old records wrong, relating, as they do, the frequent destruction of man by Wolves; so much so that in the ancient days of Europe, the Wolf was the most dreaded of wild animals? Or are the modern Wolves of different species?

The answer is, the modern Wolves are the same as the old ones, except in one particular, *viz.*, that they have been educated by gunpowder to let man alone. Man with the modern gun is a different creature from man with the bow and arrow. The Wolves have learned this, and are now no more a menace to human life than are the Prairie-wolves or Coyotes. Not only do they abstain from harming man, but they have learned that they are likely to be harmed by him, unless they keep out of sight in the daytime. This, I think, is why Wolves are so rarely seen, even where comparatively common.

In accounting for these changes, it is not necessary to attribute human intelligence to this animal. Evidently much hard luck and many unpleasant surprises have engendered in it a deep and general distrust of all strange things, as well as a well-founded fear of anything that bears the taint of a human being. This distrust, combined with its exquisite sense of smell, may explain much that looks like profound sagacity in this animal. Nevertheless, this will not explain all, as I have had very good reason to remark again and again, when I have endeavoured to trap or poison Wolves on the Cattle ranges.

And even ascribing much to mere shyness does not remove it from the sphere of intelligence, though doubtless ranking it lower in that department, making it a vague fear of the unknown, in place of a dread of danger well comprehended.

Strength

Although we must be cautious about receiving accounts of the Gray-wolf's ferocity, we are sure to be surprised by facts about its strength. I have known a young Gray-wolf, scarcely 6 months old, drag off a 100-pound bar of iron to which it was chained, taking it 200 or 300 yards without stopping and a quarter of a mile before discovered. This same cub could almost hold its own against an ordinary man pulling at its chain. I have several times seen a Gray-wolf in a trap go off with a drag that weighed considerably over 100 pounds; and on one occasion, I saw an 80-pound female that was trapped, drag a 52-pound beef-head over rough ground faster than I could follow on foot, and keep up the flight for one and a half miles.

I have known a Gray-wolf go off carrying the head of an Ox in his jaws, and take it so far that I gave up following his trail in the dust. I did

not weigh the Ox-head, but found that a small cow-head weighed over 50 pounds, so that it must have been at least 75 pounds.

The Wolf's great strength, indeed, is in his jaws. It is doubtful whether any Dog of truly domesticated race has such powerful jaws as the Wolf. It is generally believed by the hunters that for this reason no Dog has yet been found which, single-handed, could conquer a full-grown Gray-wolf.

The rope used for lassos on the Plains is half-inch manila, and yet has often been cut through by a single clip of the Wolf's jaws when he has been lassoed.

Theodore Roosevelt gives thus an instance of a Gray-wolf killing a Horse. "With a few savage snaps, the Wolf hamstrung and partially disembowelled it."[83] Many similar cases could be cited.

Writing on the prowess of the Wolf, Grinnell says: "I have said something about the power of the big Wolves, and it is well known that a couple of them can pull down a two-year-old heifer without trouble. The reason I know this is because I have seen them do it. A couple of Wolves had a bunch of stock rounded up in a valley, and were just walking about and holding them there, when suddenly one of the Wolves made a plunge into the Cattle. A foolish young two-year-old dashed out of the band and the other Wolf had her cut off the moment she separated from the bunch. Then both Wolves made a dash at her, caught her by the hind-legs, spread her apart and killed her, I think, in 10 seconds."[84]

The strength of its jaws is, doubtless, a cardinal factor in the Wolf's life-problems, not only putting it beyond danger from other carnivora, but also leaving all herbivora at its mercy.

Doubtless its hold on environment is largely due also to endurance. A Wolf can live on one full meal a week; that is, a dozen meals at equal intervals would carry it through the winter.

The Wolf that Archbishop Taché tells of roamed for a month in deep winter, at Isle à la Crosse, with a heavy trap and clog on his hind-foot. It is hard to see how he could have got a meal in all that time, and, though emaciated, he was very lively indeed when found.[85]

His Method of Hunting

The species is credited by most hunters with cunning enough to hunt by combined drive and ambush, exactly as described in the chapter on the Coyote. This I have not personally witnessed, but many observers have

[83] The Wilderness Hunter, p. 394.

[84] Forest & Stream, Dec. 26, 1896, p. 512.

[85] Esquisse sur le nord-ouest de l'Amerique (1868), pp. 120–21 in new edition of 1901.

Thus J. H. Higby of Big Moose Lake, N. Y., writes in *Forest & Stream*, April 17, 1897, p. 305, on Adirondack Wolves: "In 1888 or '89 the writer and Fred Hess, a well-known guide, killed a large Wolf on the head of Fourth Lake, Fulton Chain. He had come out on the ice about 40 rods and lain down in the snow to await the arrival of another Wolf that was after a Deer. We saw him and went out and killed him. That was one of the last."

"On another occasion," says Mills, "I saw 3 Wolves drive a Deer from a canyon and so direct its course that it emerged where the way was covered with a deep snowdrift. As the Deer floundered through the soft snow, it was pounced upon by a fourth Wolf, which was lying in wait at this point."[8]

George Shiras 3d is of the opinion that the Gray-wolf is a still-hunter. He stalks his prey till within reach of a rush and a spring. Most of the Deer that Shiras has seen killed by Wolves, were captured within 50 yards of the first jump.

Mark Robinson, Ranger of Algonquin Park, has given an interesting account of a still-hunt that he partly saw and partly read in the snow.

"Going down Canoe Lake, we noticed the lone track of a medium-sized Wolf that had visited our old baits, showing his contempt in the usual manner. Reaching the foot of the lake, I was to follow a ravine to the top of a large hill covered with hardwood timber, while my companion was to follow around the base of the hill and come up from the other side. He followed the trail of the lone Wolf which was going in his direction. I walked slowly up the ravine until near the crest of the hill, when I heard a scutter in the snow. Looking around, I saw an object move and drop out of sight. Hurrying to the top of the hill, I saw a Deer raise its head and drop it again. I walked over and found it just dead. It had been killed by the lone Wolf.

"From about 200 yards distance my companion called to me, saying the Wolf had jumped a Deer. I replied that it had killed it where I was standing. We came back together and found the Wolf had been about 40 paces from the Deer when it commenced to rush at it. The Deer had at first apparently jumped up into the air, and did not appear to run well until about 50 yards were covered, then they ran side by side for about 120 yards, when the Wolf hamstrung the Deer, making a cut almost as clean as a knife. A few more short bounds and the Wolf sprang upon the Deer's back, breaking the back at one bite, tearing the flesh so that the kidney could be seen, then he had attacked the throat, when, no doubt, he scented danger and quickly made his escape into the deep hemlocks.

"The Deer was a fine healthy young buck about 3 years old. As far

[8] Watched, p. 143.

as we could see, everything was in favour of the Deer travelling fast—good bottom, about 8 inches loose snow and slightly down grade."[87]

These methods, however, are for the swift-footed Deer. In dealing with range Cattle in the open, the Wolf uses different means of attack. Enos A. Mills describes one that he had the good luck to witness:

"On one occasion," he says, "in southern Colorado, I saw a herd of Cattle standing in a circle with their heads outward. A number of Wolves were attacking them. By leaping unitedly—first at one, then at another—they finally frightened one victim out of the circle of safety. He was at once driven away from the herd, and in a short time the Wolves had disabled his hindlegs and pulled him down."[88]

The Wolf is still-hunter or marathon chaser, as seems best calculated to serve his purpose, and curious light on his ways is afforded by these remarks from J. B. Thompson of Chicago. He writes from Doniphan, Mo.:

"There is hardly a hunter in the swamps who has not seen or killed a Wolf at some time or other while calling turkeys in spring, for if there are any about, they often respond to the call in anxious anticipation of a capture of some fat gobbler or hen."[89]

An extraordinary case of Wolf cunning is given by E. Haslam, B. C., in *Forest & Stream*, Sept., 1921, pp. 406-7. It is related of a traveller named Calhoun.

"He and his two companions were hunting in northern Alaska and while snowshoeing, came near a lake which was frozen over, when they observed 3 Wolves travelling in an opposite direction to themselves. They estimated that if they maintained their course, they would pass at a distance of perhaps 40 or 50 yards. Our friends were partially hidden from view by snow and scrubby brushes. As the Wolves approached nearer, coming in single file, Calhoun noticed a raven circling at a short distance above them.

"When the Wolves were nearly opposite them and the men were about to fire, they saw the centre Wolf suddenly swerve a little, and his body stiffen, and his legs, seemingly paralyzed, slither from beneath him, and in an instant he was lying stark and stiff on the ice. The other two Wolves kept right on without slacking their pace or turning their heads to glance at their companion. Needless to say, the hunters lowered their guns, and stood watching the scene with keenest interest.

"The raven, evidently more interested in the still form lying on the ice than in his departing brothers, alighted at a little distance, after circling a

[87] Forest & Stream, July 6, 1912, pp. 9-10.

[88] Watched, p. 145.

[89] Forest & Stream, Feb. 13, 1909, p. 253.

few times above the prostrate animal. He hopped and pecked at the Wolf, and the next peck would probably have been at the Wolf's eye, but with a swift movement of the head, the cruel jaws of the waiting Wolf snapped upon the hapless raven and he was killed."

Fishing

That the Wolf will eat fish no one doubts; but that he will turn fisher and poacher is a new idea. Nevertheless, Bernard R. Ross records a remarkable case in point. The evidence is purely circumstantial and not complete at that, but Ross was a good naturalist and evidently believed the case proven:

"In the month of May," he says, "when the holes cut in the ice do not freeze up, the fisherman at Fort Resolution, on visiting his trout lines, set at some distance from the Fort, discovered that several had been visited; the lines and hooks were lying on the ice, as well as the remains of a partly eaten trout, and a Wolf's track was observed about the place. The fact was the Wolf had hauled up the lines and helped himself to what fish he required. This occurred again and then ceased, the animal having been probably driven away by the Dogs of the Post."[90]

Thomas Anderson, Hudson's Bay Company factor at Fort Smith, says he has no doubt that this took place exactly as described by Ross.

Storage Habit

The habit of burying surplus food seems to be common to all the Wolf tribe. Roland D. Carson writes me of the Wolves in the Philadelphia Zoo: "Our males and females often bury surplus food, but the females have not been observed to do so more than usual just previous to the birth of the young."

Captain Craine's half-wolf train-dogs, if not hungry, would bury their food, and water on the place or even on the food. This latter performance is explained in the Wolverine chapter.

Property Instinct

These train-dogs afford much light on the ways of their wild kinsmen. One of them will watch his cache all day and in its defence fearlessly attack another that ordinarily he was afraid of. The big Dog rarely presses the point under these circumstances, but acts as though he knew his cause was weak. This beginning of property law is of cardinal interest.

[90] Fur-bearing Animals, Mack. R., Can. Nat., Jan., 1861, p. 10.

These hoards may be of vital service to the Wolf, but the instinct, as at present developed, is very crude and scarcely to be compared with the fine providence of Beaver and Squirrel.

The Wit-match with Man

When the Buffalo swarmed over Western America from the Alleghanies to the Rockies, and from Great Slave Lake to Central Mexico, their herds were followed by bands of Buffalo-wolves that preyed on the weak and helpless. As the Buffalo disappeared the Wolves were harder put for a living. When the last great Buffalo herds were destroyed and the Wolves were left without their usual support, they naturally turned their attention to the Cattle on the ranges.

The ranchmen declared vigorous war against them; traps and poison were imported in vast quantities, a bounty was offered for each Wolf scalp, and every inducement held out to Wolf-hunters.

In those days the Wolves were comparatively unsuspicious, and it was easy to trap or poison them. The result was that enormous numbers were killed in the early days of 1880 to 1888 or 1889; so many, indeed, that the species seemed on the verge of extinction. The remnant of the race continued on the foothills of the Rockies or the Badlands, but they were so rare as to be no longer a factor in the Cattle question. Then new knowledge, a better comprehension of the modern dangers, seemed to spread among the Wolves. They learned how to detect and defy the traps and poison, and in some way the knowledge was passed from one to another, till all Wolves were fully possessed of the information. How this is done is not easy to say. It is easier to prove that it *is* done. Few Wolves ever get into a trap, fewer still get into a trap and out again, and thus learn that a steel trap is a thing to be feared. And yet all Wolves have that knowledge, as every trapper knows, and since they could not get it at first hand, they must have got it second hand; that is, the information was communicated to them by others of their kind.

It is well known among hunters that a piece of iron is enough to protect any carcass from the Wolves If a Deer or Antelope has been shot and is to be left out overnight, all that is needed for its protection is an old horseshoe, a spur, or even any part of the hunter's dress. No Wolf will go near such suspicious-looking or human-tainted things; he will starve rather than approach the carcass so guarded.

With poison, a similar change has come about. Strychnine was considered infallible when first it was introduced. It did vast destruction for a time, then the Wolves seemed to discover the danger associated with that

PLATE LIX—WOLF STUDIES
By E. T. Seton

particular smell, and will no longer take the poisoned bait, as I know from numberless experiences.

It is thoroughly well known among the Cattle men now that the only chance of poisoning Wolves is in the late summer and early autumn, when the young are beginning to run with the mother. She cannot watch over all of them the whole time, and there is a chance of some of them finding the bait and taking it before they have been taught to let that sort of smell-thing alone.

The result was that the Wolves increased during the late 80's. They returned to many of their old hunting grounds in the Cattle countries, and each year they seemed to be more numerous and more widely spread, thanks to their mastery of the new problems forced upon them by civilization.

But the growing extent of ravages led to higher bounties, so that many men became Wolvers, that is, professional Wolf-hunters. New means of destruction were invented, but by far the most effective of these was the plan of locating the dens.

In the northern Cattle ranges, the young are born while yet there is snow on the ground, and it has proved quite easy to back-track the old Wolves, discover the den, destroy the brood, and later the old ones, for they continue to hover about till shot. Thus their parental devotion is made the means of their destruction.

Such methods have resulted in a steady diminution of the Wolves, till now the time is in sight when the Gray-wolf will be extinct on the Cattle ranges of the Western States.

The Way of the Wolver

Wolves are so rarely seen that shooting is not to be relied on as a means of keeping them down.

Hunting with Dogs has been carried on with fair success, but it requires a composite pack of running, tracking, and fighting Dogs, as well as the best of Horses, so that it is somewhat expensive.

In the early days, the Indians captured many Wolves in pitfalls. The following, from Henry's "Journal" (p. 322), bears on this:

"We had now [south of Turtle Mountain] a well-beaten path, but were several times in danger of breaking our necks in deep pits which the natives had dug in the path to catch Wolves and Foxes in winter. Some of them are 10 feet deep, hollowed out to a space about 30 feet in circumference, whilst the entrance is no wider than the footpath and about 5 feet in length. These holes are covered with dry grass at the season when Wolves are good, and every morning are found to contain some of those animals. In summer

the grass grows strong and high about the mouths, entirely concealing them, until one arrives upon the very brink, and is in danger of tumbling in headlong."

Poisoning, once quite easy, is now very hard to practise, since the Wolves have learned the smell and dangers of strychnine. At one time, I killed Wolves with poison, and invented new methods that were uniformly successful. But the need of such things is gone, and I shall disseminate no more information to help in the extermination of these wise and wonderful creatures.

As a picture of Plains life, in the old days, and a method of killing Wolves that is now utterly impossible, thanks to the wisdom of the modern Wolf, I quote from the story of my old friend, "Yellowstone Kelly":

"About 22 years ago," he says, "Flat Willow Creek which runs south of the Judith Basin, Montana, into the Musselshell, was a pretty wild-looking country We pitched camp there one winter's day in a very respectable and commodious-looking Sioux war-house, built, teepee fashion, of dry poles and chinked fairly tight with broken slabs and sticks of cottonwood. We were after Wolves, Foxes, and Beaver.

"In the afternoon I sallied out by myself to take a look at the country. Before me were the dark gulches of the Musselshell, topped by cedar-covered buttes that looked far away toward the Yellowstone. Crossing some little prairies and creeks, I came to a flat that had once been the home of a village of Prairie-dogs, and on a rise beyond it I saw a Buffalo cow standing alone.

"I manœuvred for some time to get close enough for a shot. When I looked again the cow had lain down. The point was rather difficult of approach, and I was crawling along low ground, when I saw 2 large Wolves trot up to the cow in feint of attack, the cow getting up and lowering her head to repel them. It was then that I saw that she was lame in one leg. The Wolves sat down in the most impudent way and watched her. I presume these Wolves had followed the cow some distance.

"After a while they left the cow and trotted around to where I was partly concealed, and surveyed me with great curiosity from several points, coming within 15 yards or nearer. I made no move for fear of disturbing the cow. I did not care about the Wolves, although they were about as large as any I had seen. I have never heard of Wolves attacking people in the Northwest. They soon left me and returned to the cow, and edging a little closer, I pulled up my .44 Winchester and shot the cow back of the shoulder. She fell a short distance off, and approaching I saw, about 100 yards away, some standing, some sitting, about 20 or more large Wolves.

"They formed a very pretty picture on the gray prairie, that was almost

PLATE LI.—GRAY-WOLF SCRATCHING HIMSELF
Life studies by E. T. Seton

PLATE LII.—BLOOD ON THE TRAIL
Wolf study by E. T. Seton

wind-swept of snow. They were not the dirty, gray Buffalo-wolf, but seemed to be more of the Timber species, with tawny markings, some approaching to creamy white. What surprised me was their utter unconcern as I came into view. They were lined up in a row, as if they had been bidden to a feast, and were not particular as to the manner in which it was served. I proceeded to satisfy them. Laying my gun and belt on the ground, I disembowelled the cow, cut and slashed the meat in the usual way, and loaded the carcass with about three-eighths of an ounce of strychnia. My audience took an unusual interest in the work of preparing this bait, but scarcely moved from their first position.

"I surmised that this was not the first time they had posed as spectators of a meat-carving diversion, and that they had probably followed the Indians on a Buffalo hunt. Though uninvited guests, I felt that their appreciation should not pass unrewarded. When I had finished cutting up the Buffalo, I gathered my gun and belt and retired from the scene as I came.

"A day or two later as we rode that way, their beautiful carcasses covered the prairie, and we secured 22 fine pelts."[91]

The undoing of the last Wolf in the Adirondacks, as related by Fred A. Potter, gives a series of vivid pictures showing the life-and-death game that Wolf and trapper play.

Although Wolves were supposed to be extinct in the North Woods, sufficient tracks and a possible Wolf howl were noted in the fall of 1893. In mid-November, Reuben Cary got a long shot at the Wolf as it crossed the open ice of a lake.

Next day he found where it had killed a Sheep, and about 3 o'clock saw a big Wolf slink away from the carcass. Rube got a far shot, slightly wounding the Wolf. He and his friend followed 5 miles in vain. That night they set a trap by the dead Sheep. Next morning they found a big bald eagle in the trap, but no signs of a Wolf.

For a couple of days, Rube kept away from the trap. Then a "fool Dog", a "no-'count" spaniel that had been left by a summer visitor, went prowling on his own and got in the trap. "When Rube came over the next morning, the Dog was in the trap with a broken leg, and Wolf tracks all around him in the fresh snow. A merciful shot put an end to his suffering. Seeing the Wolf tracks in the snow, Rube moved the remains of the Sheep over near the Cattle corral and reset his trap there. He took the dead Dog and threw him in a pile of brush across the road. Expecting results, he went out early the next morning, but, to his surprise, found that the Sheep and trap were undisturbed, but that the Wolf had been feeding on the

[91] Forest & Stream, Feb. 20, 1897, p. 145.

dead Dog. He moved the trap from the Sheep carcass to the brush pile, and set it where the Wolf had climbed up after the Dog.

"That night it snowed about a foot, and the next morning the storm was unabated. However, Rube put on his snowshoes and set out for the clearing. His persistency and perseverance were rewarded, for when he came over the hill into the clearing, there stood a tremendous, gaunt Gray-wolf, one front foot in the trap. He had put up a terrific fight for his freedom. The ground was torn up in all directions and the snow trampled down, but the old Newhouse trap had held. Rube said the Wolf hung his head and acted sheepish, as though he were ashamed of himself for getting caught.

"This was the last Wolf caught or killed in the Adirondacks. He was mounted, and is now in the private collection of the late General E. A. McAlpin, of Brandreth Lake."[92]

[92] Forest & Stream, Feb., 1923, p. 89.

Famous Wolves

Just as there are geniuses and heroes among men, so there are extraordinary individuals among Wolves. These have always interested me, and I have endeavoured to record the lives of such as came to hand.

The pages of European history are picturesquely varied by accounts of wonderful Wolves that appeared from time to time, unusual specimens that left frightful records of destruction among men and Cattle.

One of the most celebrated was *La Bête de Gevaudan* which lived in Central France about 1760 to 1765, during which time he devoured 93 persons and mangled some 30 more, before he was destroyed. He stood 35 inches at the shoulder and weighed 165 pounds.

In our own country we have no lack of famous Wolves—heroes, for they are the unusually gifted individuals that have appeared, bravely fighting with unusual success their own hopeless fight against us. One of the first of them that I met was the *Winnipeg Wolf.* In March, 1882, while coming to Winnipeg from St. Paul, I saw a sight that stirred my blood. As the train flashed through an opening of the poplar woods south of St. Boniface, there stood a great splendid Gray-wolf, erect and defiant, surrounded by a motley rabble of town Dogs, big and small. A small Dog was lying in the snow near him, and a big Dog was bounding about doing some magnificent barking, but keeping his safe distance. The train passed and I saw no more.

A dog-driver was killed next winter on the ice of the Red River while bound for Fort Alexander. The team were big fierce Huskies, and he was a strange driver. It was thought that he had struck at one of them with the whip, it had snapped back, and he, in retreating, had fallen, whereupon the four savage creatures had set on him and ended by devouring him. The counter theory was that he had been killed by a Wolf or Wolves, of which the Dogs are notoriously afraid. The latter explanation found favour only with the Dogs' owner, for the reason, people said, that he did not wish to lose his valuable team.

A large Wolf was seen several times afterward about the city, and at length was killed near the slaughterhouse, some said, by poison, Dogs, guns, or all three. This was a male and weighed 104 pounds. It was mounted by W. R. Hine, the taxidermist, and shown at the Chicago Exposition of 1893. This interesting relic was one of the valuable specimens lost in the Mulvey Grammar School when the building was destroyed by fire in 1896.

I have, of course, no evidence that in each case it was the same Wolf, but in writing the story of "The Winnipeg Wolf" I took a writer's liberty in making them so. The other adventures ascribed to him really belonged to other Wolves in distant regions.

In the story of "Lobo," I assumed a similar freedom. I ascribed to one Wolf the adventures of several, and I selected for him the most heroic exterior I could find in fact. But the final chapter recording his capture and death is given exactly as it happened, and was indeed the inspiring motive of the story.

At Carberry, Man., in 1897–98, a huge black Wolf appeared. He killed many Sheep and calves and spread terror among the parents that had children going to school, but he never even threatened a human being. He was known as the *Black Buffalo-runner*. He was killed by Alexander Langmuir.

The White Wolf of Pine Ridge. While at Pine Ridge, S. Dak., in August, 1902, I was told by Dr. James R. Walker and many others, that during the past 3 years, the country between there and the Badlands (15 miles) had been frequented by an enormous White Wolf. The Wolves in this region were increasing and becoming so troublesome that a 25-dollar bounty was paid for each scalp, but double was offered for that of the White Wolf. It was a female, as it was once seen with 7 cubs. One of them was caught and staked out for a decoy, but the mother came by night, eluded the watchers, pulled up the stake, and bore off her offspring in triumph. She flourished until 1912, when at last she fell a victim to the Wolvers.

The Werewolf of Nut Lake. My old friend, George F. Guernsey, contributes an account of the Werewolf killed March, 1898, near Fort Qu'Appelle, Sask. It had slaughtered many Cattle and ponies; finally killed a 5-year-old stallion weighing more than 1,200 pounds.[93]

The Roosevelt Wolf. In 1897, when I hunted with the Eaton boys at Medora, N. D., over Roosevelt's old range, there was a giant Wolf in the neighbourhood, well-known and dreaded because of the havoc he made among the Cattle. He was sometimes called "Mountain Billy" on account of his headquarters being supposedly about Sentinel Butte. On the first night, when I camped near that landmark, we heard the deep howl of the great Wolf. The Dogs heard it too. They might run valiantly and noisily in the direction of an ordinary howl, but this one they seemed to know and fear. They growled ferociously, their manes bristled in response, but they did not leave the light of the camp-fire circle. Several times we followed what we believed to be his trail, but the hounds did not show any eagerness

[93] Recreation, Dec., 1898, p. 460.

to force an issue, and we saw no sign of him except some dead Cattle. Yet each night we heard that deep defiance from some not-far butte.

Since 1894 at least, this Wolf had been known and feared as a Cattle-raider. His monstrous footmarks were found many times along the Little Missouri and about the ranchman's door in the early morning, and the Eaton children saw him a number of times as they took their daily ride to school. But the men got no chance to shoot at him. The Dogs would not follow him, and for traps and poison he had a perfect contempt, expressed in the usual way.

Ten years he lived on this fat Cattle range, killing in that time many thousand dollars' worth of stock. Never, however, did he molest a human being. G. W. Myers, the cattleman, had the luck to get him at last. The following paragraph from the St. Paul *Dispatch*, April 1, 1902, announced the fact:

"The biggest Wolf story of the season comes from Billings County, where G. W. Myers was the lucky captor. Lupus in this case is reported to have been 7 feet 10 inches from his nose to the tip of his tail, and to have weighed 168 pounds, dead. His Wolfship is by no means the largest ever killed in North Dakota. He had been a long-time offender, and Mr. Myers had for years made a standing offer of $50 for his capture. It is estimated that he has killed $5,000 worth of stock. Within the last few months, he has killed a number of full-grown Cattle on Mr. Myers's ranch."

I wrote for confirmation of the statement. Willis Eaton replied at once that he believed it was quite accurate. Mrs. Myers also corroborated the story in the following words:

"The item is correct. The big Wolf passed just in front of our door many times at night, as we knew in the morning by the monstrous tracks. The men never ceased trying to get him by traps and poison. But he was too clever. Often, he went within a few feet of the trap, but he would back off and go around, as though he knew just what it was.

"By the river, there was a trail along a cutbank that he often used. At one end, it dropped some six feet. At this place, in the spring of 1902, the cowboys set a big trap, hidden in the dust. Pretty soon, he came along in the night, jumped down the 6-foot drop as usual, and landed squarely in the trap.

"We knew nothing of this at the time, but in the morning, on turning the Cattle out, they made a great stir, seemed frightened and ran about, bellowing near the cutbank. The boys went and found the big Wolf in the trap. He was held by two toes only, and would soon have got away, had they not come just then.

"He was so old that his teeth were worn off almost to the roots.

"My husband meant to send the skin to President Roosevelt, but it was found to be in bad condition, not fit to be tanned.

"It is not known positively that this and 'Mountain Billy' were the same, but 'Mountain Billy' also disappeared at this time."

It is to be hoped that some of our friends at Medora who have an interest in local history, will gather all the facts they can about the "Great Wolf," while yet they are available.

The White Wolf of Cheyenne had the curious experience of passing his youth in captivity. In the Denver *News* (Nov. 9, 1899), he is thus recorded:

"The great White Wolf has made his appearance after an absence of 3 winters. This great white marauder owes his names of *Buffalo Bill* and *Cody's Captive* to the fact of his being captured while a pup on one of the far northern Montana ranges by Col. Cody. The Colonel took his captive to the North Platte Cody Ranch, whence the Wolf, at a year old, escaped and made his way to the northward, finally locating near the Grover Cattle ranges.

"'Buffalo Bill' is proving himself more savage and voracious than ever."

The life and death of the *Custer Wolf* is thus detailed in the *Yearbook* of the U. S. Dept. of Agriculture, 1920, p. 297.

"This animal had ranged in a territory about 40 by 65 miles in extent in the vicinity of Custer, S. D. During the 6 or 7 years that he is known to have patrolled this territory, stockmen who suffered from his depredations estimated that he had killed at least $25,000 worth of Cattle. His killings were particularly exasperating, owing to the number of stock slaughtered at times when he appeared to go on a killing debauch, and to the savage mutilation of others—many cows having been killed for the sole purpose of devouring their unborn calves. Because of this and of the reputation which the animal gained for supernatural cunning in eluding hunters and avoiding skilfully placed traps and temptingly prepared poison baits, unusual efforts had been made by sportsmen to 'get him.' Stockmen, driven to desperation, offered increasingly large bounties, until there was a price of $500 on his head. Still he escaped.

"Some ranchers gave up hope and said they must board the outlaw until he died a natural death. Others, more sanguine, appealed to the local predatory animal inspector of the Biological Survey for the detail of a hunter, and one of the best trappers and shots in the service was sent on this mission. During several weeks of hide and seek, the Wolf displayed his uncanny cunning, but finally placed his front foot squarely in a trap baited with scent material obtained from another notorious Wolf that had been taken by the predatory animal inspector at Split Rock, Wyo. As he dashed

away, the trap drag caught firmly on a tree, but the swivel snapped. Dragging the heavy trap with him, the Wolf travelled a distance of 3 miles before the hunter, close on his trail, got a shot at 300 yards and ended his career of destruction. Many Wolves of similar cunning have been taken by Biological Survey hunters, but this animal was one of the most difficult to capture.

"The death of the Custer Wolf was hailed with delight by stockmen throughout the region where the depredations had occurred, and has added impetus to a movement for coöperation with the Department in order to meet more adequately the needs of the live-stock industry."

Some Strange Incidents

The Penalty of False Witness. In several different forms I have before me the tragic story of the Wolf that seemed to have made a false report on his hunting. It is one of those persistent ideas that are accepted by hunters in proportion to their familiarity with the animal. These testimonies should at least be kept in mind awaiting further light before they are rejected as baseless fabrication.

One of the latest and most detailed cases has come to me from Vancouver Island. It was told by Walter Harvey of British Columbia, and is vouched for by J. R. Lowther of Vancouver, as well as the recorder. It appeared in the *Daily Colonist*, Dec. 10, 1922.

"Almost 40 years ago, a small party, consisting of a surveyor and myself and 2 other men in an Indian canoe, went over from Vancouver Island to Cortez Island, at the north end of the Gulf of Georgia, to do some survey work there. It was late summer with fine weather, and clear enough to see some distance over the water and along the shore, though the gulf, as usual at that time of year, was overhung by a perpetual pall of smoke, caused by the forest fires, which were always going all over the coast in those days, generally beginning about the end of July and lasting until the first heavy rain.

"As we were nearing the shore of Cortez Island in the afternoon, I shot and killed a Hair Seal. As soon as we had landed ourselves and our outfit, I went to get the Seal, which was in very shallow water, as it was low tide. It was too late to do any work that day, and the camp was soon fixed up. I dragged the Seal up a piece and took off the skin, which was all I wanted.

"The body of the Seal lay on the shore about a quarter of a mile from the camp, and very soon after I got back and while I was stretching the skin, one of the other fellows said: 'Look! Look!' and pointed to the Seal. We all saw a Wolf dragging the Seal up the beach, and just above high-water mark he or she scratched a shallow hole and pulled the Seal into it and pro-

ceeded to cover it over with sand, shingle, bits of driftwood and seaweed and so forth.

"The Wolf then went off into the bush, and not very long after we heard a Wolf howling, but not quite like they do at night, somewhat shorter and more emphatic, and not so long drawn out.

"One of the men said he wanted the fat off the Seal's body to make 'Seal oil.' He was a little afraid of going after it, but, as we assured him that there were no cases of Wolves on this coast attacking men, he concluded to take a chance, and so he ran to where the Seal was buried, and, uncovering it, he made fast to its feet a short line he carried and hauled it over to the camp, and as it was easier to travel down on the sand at the edge of the now rapidly incoming tide, he came back that way and then up again to the beach above high-water mark and close to the camp, but a little beyond it, so that where he was messing about cutting off strips of fat and we stood watching him was out of sight from where the Wolf had buried the Seal.

"By-and-by the old man, the surveyor, called us loudly and hurriedly to come and 'look! look!' again, and we ran to the camp from which we saw a bunch of Wolves over close to where the Seal had been buried, digging furiously, and then they suddenly left off digging and ran down along the trail where the Seal had been dragged on to the sand to the edge of the water, where of course it was lost to them, because the tide had now come up over it. They ran to and fro for a few minutes. There were 5 altogether. Then again all of a sudden one of them fell on another and almost immediately the other 3 joined in. I jumped and got my carbine out of the tent and set off along the beach; but as it was not much use to shoot at over 100 yards at a wriggling animal, I kept on till I was about that distance from them, and by that time they had seen me and set off for the woods one behind the other. Only 4 left the beach. I fired several shots, but I was out of breath and rather excited as well, and I did not hit any of them. They disappeared and I went on to look at a dark shape lying flat on the edge of the water. Of all the filthy, ragged, bloody things I ever saw in my life, the remains of that Wolf, which apparently the others had killed out of spite, thinking it had deceived them, that was the worst."

In H. B. Small's "Animals of North America", 1864, p. 43, is a similar incident, and I have met with it elsewhere in several different settings.

Before we dismiss these reiterated testimonies as mere fairy tales, let me remind the critics of these facts and possibilities:

It is common for the mother Wolf to go seeking food, and, having found it, to hide it, and, without eating any of it, to go and return with

PLATE LV.—BLANCA IN THE TRAP
From photograph by E. T. Seton

PLATE LVI.—LOBO IN THE TRAP
Currumpaw, New Mexico, January 31, 1893
From a photograph by E. T. Seton

PLATE LVII.—GRAY-WOLF APPROACHING TO ATTACK
Life study by E. T. Seton

her own young ones. Knowing there was a chance for feasting, other Wolves might come too. Arrived at the place, hungry and quarrelsome, they might easily fight among themselves or attack the one whose feet were smeared with the blood of the expected quarry, or kill and devour some one of the gathering—maybe the original mis-guide and maybe not. It is usually hard to identify the individual.

The Folksiness of the Wolf

We have been fed for so many generations on tales of the Wolf's ferocity, treachery, rapacity, cowardice, and strength, that most persons begin with a wholly wrong picture of this most interesting animal.

Now that enough scattered fragments are offered to make, when assembled, something like a detailed and truthful record, we find that the old picture of the Wolf has little resemblance to the Wolf of fact. If we were to sum up the character of a typical modern Wolf, we should describe it as the shyest, wariest, wisest, of all our wild animals, the one least seen and most heard in proportion to its numbers, and endowed with tireless strength and endurance; that is, if there is such a thing as a typical Wolf—which of course there is not, any more than there is a typical man.

Let us remember, first, that the Wolf is simply a big wild Dog, getting his living by his wits and the strength of his jaws. But Wolves vary as Dogs do. The individual variation is so great that any sweeping generalization is sure to be wrong. There are brave Wolves and coward Wolves; there are fierce Wolves and shy Wolves. Yet this, one may safely state: all Wolves are highly intelligent, exceedingly shy, and hardest to trap of all the wild things that roam America to-day.

This refinement of wits, this modern education, is the result of our continual warfare against them. For the Arctic Wolf shows little of these traits, being in a land where man is rarely seen and is not continually hostile.

So we have declared bitter, exterminatory war on the Wolves. We have evolved a creature that for long has defied us.

There are Wolves in every part of continental Europe to-day where there is rough or wooded land to harbour them. In France alone, 8,000 Wolves were killed in the 12 years 1882 to 1894.[94]

In America the war goes on.

His Courage

Though repeated by most writers that Wolves are cowards, the sweeping statement seems not well founded. A Wolf never voluntarily attacks

[94] Dr. T. S. Palmer: Yearbook, U. S. Dept. Agri., 1896, pp. 64–66.

mankind, for the fear of man has been widely spread among its kind; yet a Wolf will attack and kill any Dog, even though much bigger than himself. A Wolf has often been known to face a whole pack of Dogs and carry off one of them in spite of the others about.

Richardson says: "During our residence at Cumberland House, in 1820, a Wolf which had been prowling round the Fort and was wounded by a musket ball and driven off, returned after it became dark, whilst the blood was still flowing from its wound, and carried off a Dog from amongst 50 others that howled piteously but had not courage to unite in an attack on their enemy."[95]

A full-grown Wolf will indeed fight any number of Dogs in self-defence, and will die without a thought of surrender. This is not cowardice.

Years ago, I was supplied with a thrilling tale of Wolf heroism by Lieut. E. L. Munson, U. S. A.[96] He had gone a-hunting with 9 big powerful wolf-hounds, the pick of several packs, trained from puppyhood to kill Wolves. Any one of them was as big and heavy as a Wolf and full of fighting courage. In the first snow of the season on the Big Sandy Creek, they struck the trail of a large Wolf and gave chase.

A Jackrabbit was jumped, and 6 of the Dogs were misled into following that flying phantom, as the hunter and 3 hounds sighted the Wolf.

The hounds were much fleeter than the Wolf, or perhaps he did not try to run very fast. He reserved his strength and made for a rugged cutbank where he had rear and flank protection. Here he faced about. The 3 fierce hounds arrived in order of speed. One by one he received them, and gashed them to helplessness with his great fangs or tumbled them over the cliff. Then, seeing the rider coming with guns, and more hounds approaching, he bounded lightly over the ridge, and was lost in the safety of the brushy coulees.

On the other hand, note the account given by Audubon. He saw a she-Wolf and her 2 cubs trapped in a pitfall near Vincennes, Indiana. He described them[97] as absolutely unresisting, abject in their submission to the trapper who leaped alone into the pit, hamstrung them, tied their jaws, and threw them out to be worried by his Dogs.

My own observations do not agree with this at all. Six times in my trapping life among the mesas of New Mexico, I have had the experience of coming to my traps and finding in them a grim and grizzly Gray-wolf. In each case the Wolf was fiercely defiant, asking only the privilege of getting

[95] F. B. A., I, p. 64.

[96] Recreation, March, 1898, pp. 171–73.

[97] Q. N. A., II, p. 129.

at me for a finish fight. In each case but one, the scene had to be ended with a rifle ball. In that one, the big brave creature died in captivity—so far as I could tell, of a broken heart. These were the Wolves of the Currumpaw pack, and these things I have set forth with but little embellishment in the story of "Lobo."

Still stronger evidence of the Wolf's valour is given at considerable length by John B. Thompson of Chicago.[98] Writing from Doniphan, Mo., he tells of the continual losses sustained by the Star Ranch Company, of Neelysville, Mo. At last they mported a pack of Wolf-hounds, and by dint of driving and shooting from stands, they succeeded in killing a number of the "Swamp-pirates."

Then the Dogs, carried away by their success, thinking that they themselves were doing it, took to hunting on their own account, and the pack began to dwindle. At first it was supposed that the neighbours had stolen the missing Dogs. But evidence in abundance came to them that the Wolves were the cause of the losses. Of Dogs, unbacked by guns, the Wolves had no fear. Killing Dogs seemed to be their favourite sport, once they found them away from the help of man.

Then the ranchmen learned the lesson that has been learned a thousand times before: that no Dog, however big and strong, has the slightest chance against a Wolf of average powers; and the Wolf at least knows it and cheerfully faces or even courts the combat.

Not an old hunter in the West but could tell some similar tales, testimony to Wolf prowess when at bay or hunted by Dogs without gun support.

An extreme and curious case was told me in 1907 by Chief Trader Thomas Anderson, as follows:

Wolves were very common on Hay River last December. An Indian travelling there had a puppy Dog trotting behind his sleigh; a Wolf dashed out of the woods to seize the pup. The Indian fired, hitting the Wolf somewhere in the head, but it ran off. The Indians went to see and found some of the Wolf's teeth on the ice; he had hit it in the mouth, blowing out the teeth. Anderson believed this Indian to be telling the truth.

Nevertheless, individuals vary so much in this highly specialized animal, that we may expect to find some that are downright cowards, as well as others of heroic bravery, just as among Dogs we find Spaniels and Airedales. The one described by Richardson as coming alone into camp to slaughter Dogs may have been a noted desperado of his tribe.

Exceptions to the rule may be accounted for precisely as in man; bodily

[98] Forest & Stream, Feb. 13, 1909, p. 252.

well-being is an essential of physical courage. Richardson says of the Barren-ground Wolves:

"When reduced by famine they are very abject and unresisting. Mr. Bell once, while residing on Mackenzie's River, caught a full-grown but famished Wolf in a Marten-trap tied to a small log which it had not the strength to carry away. He went to the Fort for a line to lead it home, and the children who accompanied him back assisted in bringing it in by pushing it on from behind. It made no resistance and suffered itself to be tied quietly to the stockades of the Fort. The experiment of taming it was not, however, made, and after the curiosity of the people was satisfied, it was killed."[99]

Men talk of their own sportsmanship and fair play and of the ferocity and cruelty of the Wolf, and then perpetrate and publish for the delight of humanity the following which I quote from a recent sporting magazine:

Two Wolves had been trapped near a cow they had killed in the Rogue River Valley, Ore. "Several of the neighbours were notified and came flocking in, bringing guns and Dogs.

"It was determined to have some lively sport with the Wolves and Dogs. All know what a savage, cruel fighter the Gray-wolf is. One can stand half a dozen Dogs off and cut them in pieces. In this case, it was proposed to give the ferocious captives no show for their lives and no chance to do any more damage. Accordingly, they were caught with ropes and very securely tied so as to be helpless. Both were muzzled so they could not bite, and their hamstrings cut. They were then untied and turned loose, though they could not escape. Immediately the big pack of Dogs pounced upon the two Wolves, and in a short time both were torn to pieces."

The Dogginess of the Wolf

A similar story to that told by Richardson is furnished from Manitoba; in this case with a wholly different ending, but emphasizing still more the dogginess of the Wolf.

The Rev. J. A. McLaughlin, of Berens River, Lake Winnipeg, wrote me, March 9, 1893:

"Wolves are quite numerous here this winter, but do not seem to band together to any extent, and are not, so far as I know, dangerous. Last week, one of the Indians, on going to his cache, where he had been doing his fall fishing, found a splendid Black Wolf in a trap. He tied his mouth with a line, took him out of the trap, hitched him up to his Dog train, and made him help haul in the load of fish. The Hudson's Bay Company officer here had

[99] Arctic Search Exped. (of 1848), 1851, II, p. 87.

him chained up at the Fort, and intends trying to make a cross with one of his Dogs. I have seen a number of Wolves, but none like this specimen. The fur is exactly like a Silver-fox in colour, thick and beautiful. The ears are much more rounded than usual, giving the head more of the appearance of a Bear than a Wolf. I have handled it, but there is never any sign of crossness, and no attempt at biting." (Mr. McLaughlin was drowned in Lake Winnipeg, Sept. 12, 1903, while faithfully doing his work.)

D. T. Hanbury, on his journey from Selkirk to Norway House, Feb. 26, 1899, says: "At this place [Berens River] I had the novel experience of riding in a sleigh drawn by a team which included a Wolf. This animal was muzzled and, though rather savage, worked well. I was told that a pure Wolf does not retain its stamina in captivity, but a half or quarter cross makes a most useful animal."[100]

Playfulness of the Wolf

Many years ago, when in Teesdale, Yorkshire, England, I was told of a certain place there called "Wolf Lake," although there is not, and never has been, any water near, but my friend, James Backhouse, informs me that it was originally "Wolf Lek," that is, Wolf Playground, the place where the Wolves were supposed to play (Anglo-Saxon, *laeken*, to lark or play). This merely added to the mystery but led me to seek for social amusements among Wolves.

Train-dogs, that is, tame Wolves, howl much on moonlight nights in winter, and in a less degree at other seasons. They do not sit around in a circle as has been stated, nor have any accompanying ceremonies been seen. They howl usually when some loud noise or one of themselves begins it. These remarks apply in a measure to Wolves. This nightly chorus was the only social amusement among these animals that I knew of at the time.

But new light arrives, as so often, from those smoky, leather-clad, unpublished volumes called "old-timers."

Dr. Woods Hutchinson writes: "Old ranchmen upon the Cattle ranges tell me that Wolves get together in quiet places among the hi ls in the autumn, just for regular games of tooth-play and romping. One of them told me that he was out looking for lost Horses one day, up in the foothills, when he suddenly saw the head of a big Gray-wolf stick up for a moment over the edge of a 'blow-out,' or great sandpit scooped out by the wind. He had only his revolver with him, but as the 'Grays' are terribly destructive to colts and young Cattle, he galloped off down a side valley at once, till he was well down from the 'blow-out,' so that his scent would not be carried

[100] Sport & Travel in the Northland of Canada, 1904, p. 6.

toward the Wolf, then hobbled his Horse and worked his way across the ridges till he finally crawled on his hands and knees up to the edge of the hollow and peeped over, thinking to surprise Mr. Wolf. But it was his turn to be surprised, for there not 30 yards below him were 7 great, shaggy brutes, each nearly as big as a Newfoundland Dog, rolling and tumbling over each other and showing great rows of glisten ng teeth, that looked as long as his finger.

"He said it struck him, all of a sudden, that it wasn't a very good day for Wolf-hunting, after all, and he rolled down the side of that hill and scuttled across to where his Horse was hobbled, as fast and as noiselessly as his legs would carry him. Fortunately, the Wolves were so well pleased with each other, and so busy with their game, that they didn't see or hear him at all, for if they had, and had caught him before he reached his hobbled Horse, there would have been nothing left of either of them, except the wood of the saddle and a few of the largest bones."[101]

A still more satisfactory account is supplied by Enos A. Mills, the nature guide. Describing the play of animals, he says:

"A tumbleweed in a Wyoming windstorm furnished the plaything in an exciting game for a pack of Wolves. I watched the play from the shelter of a ravine. Flying before the wind, the tumbleweed bounded a ridge with a huge Wolf leaping after it. Closely pressing him came a pursuing pack of twenty. A lull in the wind and the tumbleweed, colliding with the leading Wolf's head, bounded off to one side. Other Wolves sprang in the air after it, but the wind carried the tumbleweed along and the entire pack rushed in pursuit.

"This big, much-branched, ball-shaped weed was two feet in diameter. When it touched the earth the gale swept it, bounding forward and rolling over and over, across the brown wide plains. After it came the closely massed Wolves. Just as those in the lead were nearing this animated plaything it was caught by a whirlwind and pulled high into the air. Two Wolves leaped and tried to seize it. Several sat down and stared after it as though it were gone forever. The tumbleweed commenced to descend, but buoyed up by the air it came down slowly. The pack surged this way and that, as the weed surged in descending, to be beneath it; and while it was still several feet above them a high-leaping fellow struck it head-on and sent it flying to one side. It disappeared in a hollow and the Wolves vanished after it. Puffs of dust and occasionally the high-bounding weed itself told me that the game was on as vigorously as ever.

"The next act opened with the re-appearance of one of the Wolves

[101] The Open Court Mag., 1904, pp. 217–18.

running up a slope and looking back over his shoulder. Up in the wind, a little behind him and off to one side, came the tumbleweed. The Wolf turned, leaped at the weed, struck it with his breast, and knocked it vaulting away. The pack, rushing into view, swerved as one to seize or strike it. Each player was intense and all were as serious as football players. A sweeping gale carried the whirling weed forward again. It came in contact with a rock outcrop and rolled to one side. The whole team rushed at the weed and tumbled pellmell around it.

"In this general mix-up two of the Wolves started a fight. The pack joined in the row, struggling and rolling about. A pair occasionally clinched, reared into the air, and fell back. The badly mashed tumbleweed with crippling bounces went on with the wind across the wide, dust-blown plains. Suddenly the fight stopped, the panting Wolves stood for a few seconds looking at nothing, then scattered. The play was over. Had it started, I wondered, as unceremoniously, as suddenly, as it stopped?"[102]

At Canoe Lake, Algonquin Park, Aug., 1922, I saw one of these Wolf-playgrounds that was in regular use. It was a 20-acre stretch of gravel in the woods, bared of trees by the railway contractors. Here the Wolves met often to play, as was attested by the abundant tracks, and occasionally by the noise.

"Playful as a puppy Dog" is an old familiar phrase, and no more true than "playful as a young Wolf," with this surprising emphasis: the Wolf continues playful far longer than the Dog, throughout his life to some extent.

Wolves and Renegade Dogs

Many cases are on record of renegade Dogs joining the Wolves; or it would be more just to say, repentant and converted Dogs rejoining their own wild kinsfolk, going back to their own people.

The Eskimo or Husky Dog is understood to be simply a domesticated Wolf, mixed with a strain of some other Dog stock. The readiness of the Wolf and Husky Dog to cross is noted by all writers on the subject. Henry, in his famous "Journal on Red River," refers to this as a regular thing, and gives a very graphic account of the way in which the female Dogs were unwittingly made to play Delilah and betray the he-Wolves into the merciless hands of their human enemies.[103]

A similar account is given by Richardson for the female Wolves about Cumberland House.[104]

[102] Advent. Nat. Guide, E. A. Mills, pp. 201–03.

[103] Journal, p. 166.

[104] Franklin's First Journey, 1823, p. 90.

The reverse situation has been recorded by Dr. W. Mitchell in *Recreation* (April, 1898, p. 314).

"For several years," he writes, "a female Wolf, lame in one fore-foot, was known to haunt a certain locality in southwestern Alberta, a short distance north of the international boundary line, and isolated by several miles from her own species. Her destructive propensities, as the mangled remains of an occasional calf amply testified, made her unpopular, and many were the expedients resorted to, by ranchers and others, to rid themselves of her.

"Finally, however, the fact became known that friendly relations existed between her and an English setter Dog, owned by a rancher near by, and that she was wont to visit his master's premises during the early hours of the night, with considerable regularity.

"Acting on this knowledge, on a recent occasion, this Dog in question was picketed out, within easy range of a neighbouring calf corral—his owner, meanwhile, gun in hand, secreting himself therein. As the stillness of night began to pervade the scene, the Wolf was heard beckoning the Dog in a friendly way to join her. She cautiously approached, and when within convenient range, a bullet brought her career to a close. . . .

"The following measurements were taken: Length, unskinned, from tip to tip, 5 feet 6 inches; chest, 27 inches; weight, 65 lbs. It will thus be seen that throughout she was an undersized specimen, and the fact that she had been a lifelong cripple, owing to the absence of all save one toe on the right fore-foot, may have had something to do with this condition."

Two large Dogs, supposed to be the offspring of a Wolf and a Husky, lived about Kildonan, Man., and terrorized the district for about a year in the early 80's. One was gray one red or liver colour. No one owned them; they lived wild. George Fraser, of Winnipeg, my informant, fired at them several times with a shot-gun, without visible effect. One day he got a close chance at the red one with No. 5 shot; the beast got away, but never was seen again; probably it died.

Says Grinnell: "It is commonly stated that Wolves mate with Indian Dogs, and it is certainly true that the old-fashioned Indian Dog often had a very wolfish look about him. Such crossing may take place by accident or possibly by design of the Indians, as stated by some travellers; but though I have been much in Indian camps, for a good many years past I never saw anything to lead me to believe that the Indians themselves tried to bring this about.

"That Wolves and Dogs will cross is certain. Twenty years ago at a ranch just west of the head of the Dismal River in Nebraska, there was a big black Dog which was the father of 7 pups by an old Gray-wolf. These

pups and their mother were notorious through all the country there for the Cattle which they killed, and they were often seen doing it. If I recollect aright, 3 of the pups looked like Gray-wolves and 4 like the black Dog. All of this interesting family save one were at length shot by Capt. L. H. North, the manager of the Cody and North Cattle ranch."[105]

One of the most interesting accounts comes from Cheyenne, Wyo., where one day arrived in triumph Charles E. Goyen, foreman of Horse Creek ranch, bearing the pelt of a huge gray she-Wolf. The story is thus told by W. A. Bartlett in *Forest & Stream*, March 12, 1910, p. 416:

"For several weeks Horse Creek ranchmen have been trying to kill a large she-Wolf and 2 Dogs which have been travelling through that country killing stock and causing other depredations about the ranches. One of the Dogs formerly belonged to Mr. Britton, and he captured the animal at one time after it went wild, but members of his family dissuaded him from shooting it. Other ranchmen have since vainly tried to shoot or poison the Dogs. The domesticated wisdom of the Dogs and the ferocity of the big Wolf made a hard combination for the ranchmen to overcome.

"Yesterday foreman Goyen located the destructive trio on the prairie, and being mounted on a swift Horse, gave chase, and after a hard ride of about 10 miles, he succeeded in running them down and roping the Wolf. He could have shot the Wolf, but knowing that the Dogs would follow her, he decided to lead her to the ranch where all 3 could be killed. With the rope well-fastened about the Wolf's body he pulled her into the ranch and the Dogs followed. All 3 were then shot.

"The Britton Dog when killed still had a bell upon it which the owner is said to have placed there to find out if the Dog was doing any damage when away from the ranch, and other ranchmen say they have heard the sound of this bell when stock was being killed.

"Wolves have been killing stock in the Horse Creek Valley, but the Dog trio was the worst of any bunch, and ranchmen rejoice over their extermination. . . .

"A similar instance of where a Wolf has joined Wild Dogs in attacks on stock occurred in the same district a few years ago, the Wolf finally being caught by a trapper at Adamson's ranch."

As Train Dog

W. F. White, the taxidermist of Winnipeg, informed me about 20 years ago, that he had no difficulty in selling living male Wolves, as they could be utilized to cross with and improve the train Dogs.

[105] Forest & Stream, Dec. 26, 1896, p. 512.

Henry also speaks of saving young Wolf cubs to be used for the trains.[106]

Captain Dick Craine, of Petoskey, Mich., tells me that he spent 9 years among the train Dogs in Alaska and Yukon, owning and handling in that time 200 Dogs. Among these he had 3 full-blooded Wolves, also used as train animals. Many half-breeds, of course, were among the Dogs, and all are more or less of Wolf blood.

The Wolf, he says, is not so good as a train Dog. It is strong enough but always more or less shy, watching its driver as though cowed, and shrinking from the touch of the hand.

The Hudson's Bay Company traders in the Great Slave Lake region tell me that Wolves are commonly tamed and used for sleigh Dogs, but play out sooner than the regular train Dogs.

The only tangible difference between a Husky Dog and a wild Wolf is in the tail. A Wolf's tail is rarely above level or curled up; a Husky Dog's is always excessively curled. Why? Perhaps it is a result of the harness toil. In hauling, unusual energy is forced into all the extremities; that in the tail is not specially directed, and therefore causes the tail to curl up, obedient to the strongest muscles, just as a man's teeth clinch under violent effort of the limbs. I doubt not, if the *flexor* muscles of the tail were strongest, instead of the *levators*, the train Dog's tail would be permanently curled between his legs.

Corroboration of this is found in a fact that I have several times observed. A train of half-bred Wolves may set off in the harness with tails down, but the moment they come to a bad place, where they must strain at the traces, their tails fly up into curl.

The Husky Dog's ears are frequently drooped. A wild Wolf's ears are erect, but, according to Captain Craine, the train Wolf at the age of 9 or 10 is apt to droop his ears.

Many observers attest the tamableness and dogginess of this animal. B. Ross says: "A full-grown Wolf became, during the months of July and August, 1857, quite domesticated at Fort Resolution. Though rather shy of the people, it lived in great harmony with the Dogs, playing and sleeping with them, and sharing their food. Around the smoke made to keep off the myriads of noxious flies from the Cattle, it reposed with the other animals, and although there was a small calf in the band, it never attempted mischief. It was shot at by an Indian and never seen after."[107]

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[106] Journal, p. 175.

[107] Fur-bearing An., Mack. R., Can. Nat., Jan., 1861, p. 11.

It is hard to understand why the train Dogs should so fear the Wolves if they are such near kin. Probably the wild ones are larger, and the train Dogs more or less cowed by their life.

A Case of Latent Ferocity

The savage nature, strong in some Wolves, however, is apt to break out at times in the train Dog, as already noted in my account of the Winnipeg Wolf on an earlier page. Another tragic incident of the kind took place recently on the Saskatchewan. It was reported to me by Dr. D. A. Stewart, of Winnipeg. A half-breed Dog-driver was taking his team and his little boy to a distant post. He left the boy in charge of the team while he went after a Deer. On his return he found the Dogs curled up asleep and nothing left of his son except fragments of his clothes. The half-breed was a devout Catholic; he drove the Dogs to the Trading Post, shot the 4 brutes, and gave them Christian burial. It is well to remember that in this case the Wolf blood was mixed with Dog.

Fidelity of the Wolf

It is only fair to offset this tale of treachery and tragedy by another that ascribes to a Wolf the fullest doglike measure of self-sacrificing devotion and fidelity. It is given as originally recorded by Walter Wood in his "North Sea Fishers and Fighters" (p. 341, 1911 ed.). It took place during the wreck of the ill-fated *Minotaur* on the North Haaks off Jutland, Dec. 23, 1810.

"There was one strange feature of the wreck which was put on record at the time. On board the *Minotaur* was a large tame Wolf which from the time it was caught as a cub had been the pet of both officers and men and had become specially attached to a Lieutenant named Salsford. When the ship was wrecked the Wolf howled pitifully, keeping close to Salsford all the time. When at last the officer tried to reach the shore by clinging to a drifting mast, his pet was with him. They were repeatedly washed off, yet helped each other back to the mast, the Wolf acting just as a big and faithful Dog would have done that was trying to save his master. The mast was driven quite close to the land, and it seemed as if the pair would reach salvation, but both were utterly exhausted and benumbed, and Salsford, unable to support himself any longer, fell away from his only hope of safety. Simultaneously the Wolf placed his paws round the drowning officer's neck, and Salsford at the same moment clasped the animal in his arms. So locked together they sank."

The Chivalry of the Wolf

One may get a shock of surprise at the admission behind such an expression, but we have been so long misled by false pictures, that the shock is salutary.

Chivalry, in its simplest aspect, may be defined as consideration by a male for a female, on account of her sex, when the sexual passion is dormant. In this light it is fair to say that there is much chivalry among Wolves. Richardson records many instances of such kindly consideration; indeed, I have heard the question raised as to whether male Dogs or Wolves will at any time attack female Dogs or Wolves, and *vice versa*. I have no personal evidence to give that they *will attack*, but I have some evidence to show that they will *refrain* from attacking.

After telling of an unusually bold Wolf that hung around Fort Franklin for days in Jan., 1827, Doctor Richardson adds:

"The same Wolf continued for some days to prowl in the vicinity of the Fort, and even stole fish from a sledge, which 2 Dogs were accustomed to draw home from the nets without a driver. As this kind of depredation could not be permitted to go on, the Wolf was waylaid and killed. It proved to be a female, which accounted for the sledge Dogs not having been molested."[108]

An interesting and more emphatic illustration is afforded by the Gray-wolf pair, Lobo and Blanca, that were kept together in the London Zoo, as already said.

These two old Wolves live in harmony the year round except when a keeper comes to the cage; both are fond of being noticed, and eager to monopolize all attention; each strives jealously to be next the bars, pushing the other away, barking and growling meanwhile, with bristling mane and evident temper.

Lobo often springs at his mate as though to bite her, but is always restrained at the last moment *by something*. What is it, if not *a feeling akin to chivalry?*

In these quarrels, if Blanca sees that she has gone too far, she apologizes by licking Lobo's face in a conciliatory manner, always effectual. (In 1909 this same relationship continued.)

The fact that the male shows chivalrous feeling, and that the pair continue as mates in the autumn and winter, when the sexual instinct is dormant, are partial evidences that Wolves pair for life.

A similar case I noted in the Rotterdam Zoo, August, 1900, where

[108] F. B. A., I, p. 63.

there were two Wolves (*lupus*), male and female. The female continually teased her mate, nipping him behind and running away. He growled savagely each time and followed barking, sometimes taking her head in his mouth, but was careful to do her no harm. And again I ask, what was it that restrained him?

Wolf Love-loyalty

John B. Burnham, the eminent traveller and hunter, gives the following interesting account of a huge male Wolf that he killed during his life on the Yukon. The pair were evidently associated although it was now the latter part of November. The devotion of the female is evident even if we do not admit that she destroyed herself for grief.

Burnham had killed the male, a huge White Wolf of estimated 125 pounds weight, and had brought the skin home on his sled.

As he made camp for the night and went on short trips to a near-by cache, he realized that he was being followed persistently by another Wolf. At last, by lying in wait, he got a brief glimpse of it, and says:

"Anxious to see if the Wolf would again show himself, I remained perfectly motionless in the same spot for several minutes. A Red-squirrel chattered, and some ravens flew up halfway between me and the spot where the Wolf had disappeared. Then I heard a twig snap on the river bank directly opposite. It was too cold to stand waiting longer, for my feet were fast becoming numb, but before I went back to the sled I ran across to the mainland, and satisfied myself from the Wolf's track that he had run up just inside the edge of the timber, coming as close as he could without exposing himself.

"This was my last trip to the cache that night. I did not go near the poison, for as the Wolf was in the immediate neighbourhood, I concluded the chances for his taking it were better if things were left undisturbed. After breakfast the next morning Mac and I started down to investigate. Another light snow had fallen in the night. Showing up plainly in this, scarcely 30 feet from our tent, we came upon fresh Wolf tracks, made in the early morning hours. To surprise Mac on his return the night before, I had cut a small tree and thrown the dead Wolf across it directly in the trail, and to this place the other Wolf had come. Plainly its boldness was due to its anxiety for its lost mate. Now that it knew conclusively the fate which had befallen him, we concluded this Wolf would not delay on the order of its leaving the country. We had little faith in finding it dead, for we thought the death of the other Wolf would put it on its guard against the poison. In this, we were curiously mistaken, however, for at the Sheep camp, a few

hundred yards below the spot where the first Wolf had died, we found the other Wolf dead also, though still warm. It was a she-Wolf, younger, smaller and darker than the old dog-Wolf we had found the night before. The top of her back was almost black, and the skin was unusually handsome. From the tracks it was evident that she had taken the poison after she had visited the dead body of her mate. She had dug it out of the snow, upset the plate and eaten half the contents. The indications suggested suicide. The sagacity of the Wolf tribe is well known, and this particular Wolf had sufficient evidence to make her fully aware of the cause of her mate's death. At various times on the previous day, she had visited the spot from which I had carried him, and though I cannot be certain of the fact, I believe that she knew the whereabouts of the poison long before she touched it. If the taking of the poison were not the act of a grieved nature, why did she return to the spot where it was hidden after seeing the dead body of her mate? Lacking a fixed purpose, the instinct of self-preservation would, one might reasonably infer, have warned her to fly elsewhere. At any rate, I give the facts as they occurred."[109]

It is not necessary to postulate a knowledge of poison, or of a future life, to justify this conclusion; but rather to realize that these were a devoted pair, and grief over the loss of her mate drove the female to such a pitch of recklessness that her usual caution was abandoned and she fell into a snare which she ordinarily would have avoided.

The Kindliness of the Wolf

P. H. Gosse, the well-known naturalist, furnishes a touching episode of Wolf goodness. I repeat it with some hesitancy.

"A few years ago," he says, "some men were going up Lee's Pond, a lake about 6 miles long, near Stanstead, which was frozen at the time, when they saw before them a party of Wolves crossing the pond. One in the centre appeared sick, and was surrounded by the rest in the manner of a body-guard. One of the men, who had a gun, pursued them, when some of the Wolves took to flight, leaving others with the supposed sick one, which, however, dropped off one by one as the pursuit grew hotter, leaving at last only 2 with it; the man then fired at one of these 2, but without killing it, and they both then fled. On coming up to the remaining one, they found it was an old she-Wolf, completely blind, as was supposed from age alone, as her teeth were almost worn down. After her last attendants had left her, she attempted to continue her course, but in a very uncertain manner, sometimes turning on her steps or going in a circle. The men put a rope round

[109] Some Yukon Notes, Forest & Stream, April 16, 1898, p. 303.

her and led her to the town. In the woods they found her den, strewed with a vast number of Deer's bones, fragments of flesh, etc., all around which the snow, though 3 feet deep, was trodden hard and smooth, and from the number of paths leading to this spot, it appeared evident that this aged Wolf had for a long time been supplied with prey by the assiduous attentions of others."[110]

Before dismissing this extraordinary story as a pure fabrication, let us remember:

1. There is a tendency among Wolves and many other animals to rally around a matriarchal leader, and to give her support;

2. The blindness may have been recent and not realized by the followers;

3. The food about the den may have been brought by the old Wolf herself or by her mate;

4. The story was accepted by P. H. Gosse who records it. He was a good naturalist and not given to romancing.

We should, at least, withhold judgment pending further evidence.

Mark Robinson says, at Canoe Lake, Algonquin Park, about 1908, "I saw the first pack of Wolves, 14 in number, come out on the lake at mid-day. They were following 4 Deer that had made a dash across the ice to an island. The Wolves were walking quite slowly and had begun to surround the island upon which the Deer had taken refuge. I opened fire at 500 yards, wounding one at the first shot. The rest of the pack scattered in all directions, until the wounded Wolf gave a peculiar howl, when the greater number returned to him and remained there until they reached the woods. I fired several more shots, but none took effect; evidently I was suffering from buck fever.

"After lunch I left a note for my companion, who had not returned from his morning patrol, then I set out fully expecting to find my wounded Wolf lying near where they entered the woods. I followed their trail all afternoon, only to find the other Wolves had neither deserted nor eaten their wounded companion, who was going much stronger at dusk."[111]

[110] Canadian Naturalist, 1840, pp. 38–39.

[111] Forest & Stream, July 6, 1912, p. 9.

STRANGE ADVENTURES WITH A WOLF

By M. W. Whittaker

This unusual story is reproduced by permission of *Rod and Gun*, in which magazine it appeared April, 1911, pp. 1425–27. Its truth is abundantly attested. It shows a little-known side of Wolf character, and explains some cases of alleged Wolf attack in which no harm was done or attempted by the Wolf. The story is told by Whittaker's uncle.

In 1871, he with two brothers and Jim Fullerton, an old miner, left their mining camp in the Peace River Valley to get provisions at Kamloops on the Thompson River, B. C. In Whittaker's own words:

"Fullerton was not in good health and as he wished to delay our progress as little as possible it was his custom to walk slowly ahead every morning as we were breaking camp and re-packing. The first morning after we left Nation River he adopted his usual course of action, but while we were engaged in fastening the packs on the Horses we saw him running toward us, his whole appearance showing tokens of fright.

"'Hello, Jim! Why, whatever is the matter?' we shouted as soon as he came within hearing distance.

"'A Wolf! a Wolf!' he gasped, when he had sufficiently recovered his breath to speak, adding, 'He's after me!'

"Sure enough, no sooner had he uttered this statement than a large Timber-wolf was seen to trot round a bend in the trail. He proved to be the largest Wolf any of us had ever seen. As soon as he saw us he stopped and gave no indications of either advancing or retreating. Although he was too far off for a good shot I drew a revolver and fired, when he started off unhurt and was speedily lost to sight.

"At the time we thought we were rid of him for good, but several times during the day we heard a mournful howl. That night after picketing our Horses and eating supper we went to bed and were just falling asleep when Fullerton's large gray Dog which was in the tent with us slunk trembling under the blankets. The folds of the tent moved a moment later and we could plainly hear a low whining. The Dog gave stronger evidences of fear, and upon rising and looking out we saw a large Wolf run off and then stop. Although it was too dark for a good aim we fired our revolvers and evidently he took the hint for he troubled us no more that night.

"For the 5 days it took us to make the journey to the fort on Stuart's Lake we heard the howling in the daytime and the whining near the tent

PLATE LVIII.—OIL STUDY OF WOLF HEAD
New Mexico, 1893, by E. T. Seton

PLATE LX.—CAPTIVE WOLVES
Photographs by E. T. Seton

at night. In the mornings too when we went to bring in the Horses, the Wolf was always standing near. Strangely enough, he never offered to molest the animals, but apparently remained near them for the sake of companionship. Whenever he saw us appear, he would run off, and though we tried many dodges, he never gave us an opportunity of getting a good shot at him.

"On arrival at Stuart's Lake we found we could have all the provisions we wanted, and loading up, we went south to Stuart's River which flows out of the lake into the Fraser. 'We'll get rid of the Wolf when we cross the river,' said one, as we were engaged in making rafts on which we might cross. When our rafts were finished, we packed our outfits upon them and paddled over, our Horses swimming alongside. When safely across, we came out on a wide open plain where we could see for miles in every direction. However, we had not gone very far when we heard one of the same weird howls that had so often disturbed us on the other side of the river.

"Clearly the Wolf must have crossed, and we had not yet parted company with him as we had supposed. The old miner, who for some time past had been afraid that he was going to die, now felt sure that his end was near.

"'It's all up with me, boys,' he said in a melancholy tone. 'What reason could that Wolf have for following us if he didn't know I was going to die and he could then get my bones?'

"Nothing that we could say seemed to have any effect in raising his spirits. We told him that the Wolf merely wanted the company of the Dog, as he was probably some old fellow that had wandered from the pack and was lost and lonely. Nothing we could say shook his superstition in the least, and he continued downcast.

"Soon after this we met a band of Indians on horseback, and when we told them there was a big Wolf not far behind, they soon had him out on the plain running for his life. It was a fine sight to see the race—the great beast going like the wind, closely followed by the wild-looking Siwashes on their peculiar-looking little ponies. They chased him up into the mountains, where they could not follow and had to give him up.

"In another 5 days, we came to the mouth of the Quesnel River, the Wolf remaining near us all the time. Here there is a small settlement and as Fullerton was so ill as to be unfit for further travel, we arranged for him to stay there while we proceeded to our ranch in the Nicola Valley, about 50 miles from Kamloops. Fullerton camped with his Dog on the opposite side of the river from the town.

"After remaining on the ranch for 2 months, I went over to Kamloops

one day for the purpose of renewing supplies. There were 2 inches of snow on the ground, and I had not gone far before I noticed the tracks of a large Wolf. The tracks were of unusual size, the strides were long and even, and they pointed in the direction in which I had come on arriving at Kamloops. While about my business in the town, I suddenly encountered Fullerton, and after the usual salutations, made inquiries about the Wolf.

"'He is still with me!' said Fullerton in a melancholy tone. 'He followed me all the way down from Quesnel!'

"Then I told him about the Wolf tracks I had seen coming from the ranch, and tried to cheer him up with the assertion that he had lost the Wolf at last.

"The next day I returned to the ranch, and the same night, just as I was falling asleep, both I and my brother heard the whining with which we had become familiar the preceding few months. We kept a large black Dog about the place, and when we rose and looked out, we could hear him and the Wolf playing together like a couple of pups. We called the Dog in and sent him out again, locating the Wolf by the direction taken by the Dog.

"Our arrangements were speedily made. My brother slipped out with the intention of going round to the opposite side of the thicket in which the Wolf was hiding, hoping to drive him my way and give me the chance of a good shot. The result justified our expectations, the Wolf running past me. The moon having risen enabled me to procure a fine shot. I saw him give a lurch but he still ran on. We decided to try poison, and put out a cunningly contrived bait, securing the Dog and returning to our rest.

"During the night we heard him howling in the distance near Nicola Lake, and the next morning when we went out the poison was gone. We found the Wolf lying dead in a gulch with a load of buckshot through the body. . . .

"Why did he leave the Dog at Kamloops, and why did he come to our particular cabin when there were others in the valley? He had followed us for 500 miles across rivers and over mountains, and the only reason I can give for his strange behaviour is that he was lonely—he wanted the friendship and company of Fullerton's Dog."

His True Character—A Challenge

Thus have I offered evidence of the courage, the chivalry, the strength, the playfulness, the love loyalty, the fidelity, the friendliness, the kindliness, the heroism, the goodness of the Wolf—completing my attempt to set before you the faithful and fearless portrait of a creature so long maligned; to piece together the little scraps of truth I have found in countless hunter-

tales, like gold raked out of garbage bins; to make you know the wild one's true character and his way of life as it really is.

Now, with all this evidence before me and much more of the same available, and with the story of Lobo in mind (for it is true in the main), can any one wonder that I love the Gray-wolf and credit him with true nobility of character—with the attributes of a splendid animal hero?

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LIFE VIII—THE ARCTIC WOLF

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The White or Arctic Wolf

Canis mexicanus tundrarum Miller

(L. *Canis*, a Dog; *mexicanus*, of Mexico; *tundrarum*, of the tundras or treeless Arctic Plains.)

Canis tundrarum Miller. 1912, Smiths. Misc. Coll., Vol. LIX, No. 15, p. 1.

Type Locality—Point Barrow, Alaska.

Eskimo, *Ki-gi-lún-uk* (Nelson).

The Wolves in general have similar habits and dispositions, but certain variations of behaviour, etc., are imposed probably by totally different surroundings, and are especially marked in the White Wolf of the North, for which reason I treat it in a separate chapter.

Originally it was described in 1823 as *Canis lupus-albus* Sabine. Type locality, Fort Enterprise, Mackenzie, Canada. But this name was preoccupied by the name *Canis lupus albus* Kerr, 1791, applied to the Siberian Wolf. Therefore in 1912, Miller proposed the name *tundrarum* (of the Barrens), and named, as the type, a specimen from Point Barrow, Alaska.

Size. A ♂, which I collected at Aylmer Lake, August 21, 1907, was: Total length, 5 ft. $6\frac{1}{2}$ in. (1688 mm.); tail, $18\frac{1}{2}$ in. (470 mm.); hind-foot, $11\frac{3}{4}$ in. (298 mm.); height at shoulders, 28 in. (712 mm.).

Weight after being bled, 88 lbs., in poor condition; was doubtless 90 lbs. alive, and when fat, 100 lbs. Capt. Geo. F. Lyons says of a very large ♂: It was "so miserably thin as to weigh only 68 lbs."[1]

Colour. Creamy white in general, deeper on the back, head, and ears; sprinkled with darker hairs on the back and tail, showing faintly the regular Wolf pattern; muzzle brown.

This may be accepted as a type, but the variations are numerous, some pure unsullied white, a few dusky or nearly black. The skull characters, that is, the narrow rostrum and palate, are perhaps safer as diagnostic features than either colour or size.

Range

The map (p. 256) shows that the White Wolf is found throughout the Barrens of the North; that is, the treeless region from Bering Strait to the Atlantic Ocean; is distributed over all the Polar islands and is found sparsely

[1] Priv. Journ., p. 90.

on the narrow rim of Greenland from lat. 70° N. E. to lat. 80° at least, and round to lat. 70° on the east shore. For Rasmussen found it on the north shore of Greenland, and it is sure to go as far as the Musk-oxen and Caribou are found.

One by one the Polar islands have been added to its known domain: Baffin Land (Fisher, *Voy. Disc. to Arctic Regions*, 1821, p. 268); Melville Island (As above, p. 145); Boothia (J. C. Ross, App. Ross' *Second Voy.*, 1835, p. X); Prince of Wales Island (Kennedy *Narr. 2d Voy., Prince Albert*, 1853, p. 139); King William Land (McClintock, *Voy. Fox*, 1860, p. 309); Victoria Land (Collinson, *Journal Enterprise*, 1889, p. 244); Cornwallis Island (McDougall, *Voy. Resolute*, 1857, p. 402); Banks Land (Armstrong, *Narr. Disc. N. W. Pass.*, 1857, p. 480); Princess Royal Island (As above, p. 300); Prince Albert Land (Collinson, p. 176); Axel Heiberg Island (Sverdrup, *New Land*, 1904, II, p. 216); Ellef Ringnes Island (As above, p. 297).

In Grant Land, which is the northern part of Ellesmere Land, A. W. Greely found the Wolf occasional.[2] He killed one at Fort Conger and saw several others.

In King Oscar Land and adjoining islands, that is the western part of Ellesmere Land, "the most noxious animal of these regions is the Wolf."[3]

In Greenland, the Wolf is considered rare;[4] indeed, Egede says he met no Wolves on the western side of Greenland.[5] Referring to the south and west, Greely says: "The Wolf has never been known in Greenland, except in two cases."[6] In North Greenland, however, Rasmussen "often saw the White Polar Wolf slinking about at a safe distance like an uncomfortable reminder."[7]

Its general distribution in the Mackenzie region is given by E. A. Preble.[8]

Haunts

Since the White Wolf is the proper parasite of the Muskox and Barren-ground Caribou, its chosen haunts are the open treeless prairies on which these animals find their homes. It may venture into the woods a little way, as do these two horned beasts, or on to the ice of the Polar Sea, but not far, and not to stay. Its ideal home is the rugged prairie country between

[2] Rep. Exped. Lady Franklin Bay, II, 1888, p. 3.

[3] E. Bay in Otto Sverdrup's "New Land," 1904, II, p. 479.

[4] Wright: Greenland Ice Fields, 1896, p. 216.

[5] Disc. of Greenland, 1745, p. 74.

[6] 3 Years, II, p. 368.

[7] Greenland by the Polar Sea, 1921, p. 299.

[8] Atha. Mack. Reg., pp. 213–14.

the north limit of the trees and the Polar Sea. Here it is found in the largest numbers, while on the Polar islands it is a rare straggler.

Home Range

While there are no definite data on the home range, we have the side light of other Wolves. When the young are small, it is probable that the pair never go beyond a 10-mile radius from the home den.

In winter, when footloose and hunger-driven, they will travel a hundred miles or more for a meal, and drift about in the wake of herds of Muskox or Caribou, all winter long in hopes of getting a youngster or a cripple.

Mating and Den

There is good reason to believe that the White Wolf pairs, and the marriage is for life as in other Wolves. The bond may be weak or nearly inoperative during winter, but it is there, and dominates their lives for half the year at least.

On Aug. 24, 1907, I examined a fine Wolf den on Aylmer Lake, N. W. T. It was a low natural cave under a huge rock near the lake shore. The actual bed was not more than 10 or 12 feet in, but well screened from the weather. It had no lining, but all about were quantities of Caribou bones. One skull was that of a buck that had recently lost his antlers. (See photo.) Of course, the den was not then in use, as the young were grown and running with their parents.

Young

There is no reason to believe the young any different in number from those of the Gray-wolf. Their upbringing is probably the same, and the father is second only to the mother in his care for them, so far as known.

A few records are at hand that give a picture of Wolf family life among these white ones.

Thomas Simpson, while exploring the Arctic coast east of the Coppermine, on July 25 1838, encountered Wolves at the mouth of a small stream near Hepburn Island, and thus refers to the incident: "The banks of this river seemed quite a nest of Wolves; and we pursued two females, followed by half a score of well-grown young. The mothers scampered up the highest rocks where they called loudly to their offspring; and the latter, unable to save themselves by flight, baffled our search by hiding themselves among the willows which fringe the stream. The leader of the whole gang—a huge, ferocious old fellow—stood his ground, and was shot by McKay."[9]

[9] Disc. N. Coast of Amer., 1843, pp. 275–76.

PLATE LXI.—AN OLD HERO

"Come one, come all! This rock shall fly
From its firm base as soon as I!"

—*Sir Walter Scott.*

PLATE LXII.—THE GREYHOUND THAT FOLLOWED TOO FAR
Wolf study by E. T. Seton

While ascending the lower part of Kendall River, a tributary of the Coppermine, on July 30, 1902, Hanbury saw 2 young Wolves "nearly as large as their parents."[10]

J. W. Tyrrell, who met them near the northmost extremity of Dubawnt Lake, on August 12, 1893, writes:

"At nightfall, after a long day's struggle with the opposing elements, as we were hauling the canoes ashore toward the shelter of some rocky cliffs, we were suddenly set upon by a pack of huge gray Wolves. A great, gaunt, hungry-looking brute with dilated eyeballs led the attack. He was the largest Wolf in the pack and a daring brute, but for once, at least, he met with a surprise, as he was promptly bored from end to end with a slug from my brother's rifle. The leader of the pack having been thus treated, the others fled, but revenged themselves by howling at us all night long from the surrounding hills.

"With the pack several little Wolves had been noticed, and when the old ones beat their retreat an effort was made to capture some of them, but unsuccessfully, for just as young partridges suddenly and mysteriously disappear in the leafy woods when danger threatens, so did these young Wolves disappear among the rocks, and though we searched carefully and must have been within a few yards of them, we could not get sight of one."[11]

Dr. R. M. Anderson wrote me from Ottawa on Nov. 16, 1923: "Once at Langton Bay, Oct. 14, 1910, while hunting with some Eskimos, we saw a Wolf on a ridge about half a mile away, howling. Soon 4 more appeared, passing along a low valley to join her. We stalked them and killed 3, all young of the year. The old one was probably the mother of the others. I do not think that the old Wolf saw us at first, but probably had our scent."

Strength and Speed

In the Gray-wolf chapter, the gifts of the Wolf are fully commented on; but these additional illustrations of strength and speed noted in the White Wolf country are worth including.

"When the alarm was given," says Captain Lyon, relating an attack of Wolves on the sled Dogs, "and the Wolves were fired at, one of them was observed carrying a dead Dog in his mouth, clear of the ground, at a canter, notwithstanding the animal was of his own weight."[12]

Sled Dogs are a favourite prey with the Wolves. Captain Lyon writes further of the White Wolves on the Melville Peninsula:

[10] Northland of Canada, 1904, p. 209.

[11] Sub-Arctics, p. 98.

[12] Priv. Journ., p. 95.

"A fine Dog was lost in the afternoon. The animal had strayed to the hummocks ahead of us without its master, and Mr. [Alex.] Elder, who was near to the spot, saw 5 Wolves rush out, attack, and devour it in an incredibly short space of time; before he could reach the place, the carcass was torn in pieces, and he found only the lower part of one leg. The boldness of the Wolves was altogether astonishing, as they were almost constantly seen from the ships during the daytime prowling amongst the hummocks, or lying quietly at no great distance in wait for Dogs."[13]

Again he says (p. 95): "The Wolves had now grown so bold as to come alongside, and on this night they broke into a snowhouse in which a couple of newly purchased Eskimo Dogs were confined, and carried them off."

Richardson records that "the Wolves destroy many Foxes, which they easily run down if they perceive them on a plain at any distance from their hiding places. In January, 1827, a Wolf was seen to catch an Arctic Fox within sight of Fort Franklin, and although immediately pursued by hunters on snowshoes, it bore off its prey in its mouth without any apparent diminution of its speed."[14]

While the Wolf can catch the White Fox in deep snow, I doubt much its ability to overtake it on the level bare ground. Foxes are usually swifter than Wolves, else they would not long survive.

Cunning

The Caribou is the favourite food, but so swift that it could always and easily escape, but for one or two stratagems that are put in practice by the Wolf.

The first is the drive and ambush, well known among the Gray-wolves of the timber country. A case is thus described by Captain Back, when on the south end of Clinton-Colden Lake on August 24, 1833. "Close by," he says, "a Reindeer appeared, running at full speed, chased by a long White Wolf, which, though it seemed to have little chance in swiftness, was nevertheless resolute in the pursuit. The Deer gradually made for a pass below the rapid, at the other side of which another Wolf was now first perceived, crouching down, with his eyes fixed on the chase, and evidently ready to spring upon the poor animal if it unhappily took the water.

"I have a strong antipathy to Wolves, however speciously attired; and though these fair-robed gentlemen were but following a natural instinct of appetite, I thought fit to interfere with voice and gesture. The panting Deer bounded past me, as if conscious of safety and protection, for the Wolf

[13] Priv. Journ., pp. 109–10.

[14] F. B. A., I, p. 63.

stood motionless for a moment, and then, scenting an enemy, slunk slowly away, under the shelter of some fragments of rocks."[15]

The pertinacity of these grim hunters in sticking to the one picked out for prey is vividly set forth in this picture-paragraph by Pike:

"It is rarely that a Caribou once singled out can escape. The Wolves hunt in bands and seldom leave the track they have selected; the chase lasts for many hours, till the victim, wearied by the incessant running, leaves the band, and his fate is sealed; he has a little the best of the pace at first but not the staying power, and is soon pulled to the ground."[16]

The Arctic Wolf is extremely cunning, and in attacking Deer or Caribou, animals which far exceed it in speed, it has recourse at times to an ingenious stratagem. The members of a pack arrange themselves in the form of a semicircle, and thus advance upon their prey, so as either to hem it in or drive it over a precipice. Sir John Franklin often found Caribou which had been thus dashed down steep cliffs and devoured, and he enlarges on the ruse as follows: "Whilst the Deer are quietly grazing, the Wolves assemble in great numbers, and, forming a crescent, creep slowly toward the herd, so as not to alarm them much at first; but when they perceive that they have fairly hemmed in the unsuspecting creatures, and cut off their retreat across the plain, they move more quickly, and with hideous yells terrify their prey, and urge them to flight by the only open way, which is that towards the precipice, appearing to know that when the herd is once at full speed, it is easily driven over the cliff, the rearmost urging on those that are before. The Wolves then descend at their leisure, and feast on the mangled carcasses."[17]

To this he adds on pp. 344–45, that on one occasion a troop of Wolves endeavoured to put the same stratagem into practice against Doctor Richardson. Having the first watch, he "had gone to the summit of a hill, and remained seated, contemplating the river that washed the precipice under his feet, long after dusk had hid distant objects from his view. His thoughts were perhaps far distant from the surrounding objects, when he was roused by an indistinct noise behind him; and on looking round, perceived that 9 White Wolves had ranged themselves in form of a crescent, and were advancing apparently with the intention of driving him into the river. On his rising up, they halted; and when he advanced, they made way for his passage down to the tents."

In my own Arctic journey, I had the chance to make several observations bearing on this trick of driving over a precipice.

[15] Back's Journal, 1836, 1892, pp. 128–29.

[16] Barren Ground of Northern Canada, 1892, pp. 52–53.

[17] Narrative Journey to Polar Sea, 1823, p. 100.

A great many of the single Caribou I saw were on the small islands. In 6 cases that came under close observation, the animals in question had a broken leg. A broken leg generally evidences recent inroads by hunters, but the nearest Indians were 200 miles to the south, and the nearest Eskimos 300 miles to the north. There was every reason to believe that we were the only human beings in that vast region, and certainly we had broken no legs. Every Caribou fired at (8) had been secured and used. There is only one dangerous large enemy common in this country, that is, the White Wolf. And the more I pondered it, the more it seemed sure that the Wolves had broken the Caribous' legs.

How? This is the history of each case: the Caribou is so much swifter than the Wolves that the latter have no chance in open chase; they therefore adopt the stratagem of a sneaking surround and a drive over the rocks or a precipice, where the Caribou, if not actually killed, is more or less disabled. In some cases only a leg is broken, and then the Caribou knows his only chance is to reach the water. Here his wonderful powers of swimming make him easily safe, so much so that the Wolves do not attempt to follow. The crippled Deer makes for some island sanctuary where he rests in peace till his leg is healed, or it may be, in some cases, till the freezing of the lake brings him again into the power of his foe.

These 6, then, were the cripples in hospital, and I hope our respectful behaviour did not inspire them with a dangerously false notion of humanity.[18]

Valour

The following from Captain Lyon's "Journal" shows that some White Wolves, at least, are full of fighting valour.

"In the evening a Wolf was taken in a trap set by the *Fury*, and three balls were fired through him while imprisoned. His hind-legs were then tied, and he was dragged out, tail foremost, by a rope; this he instantly bit through with ease, springing at Mr. Richards, who was the nearest to him, and seizing him by the knee; being thrown off, the animal flew at his arm, but, with great presence of mind, Mr. Richards grasped his throat and flung him back, at the same time retreating a pace or two, when the Wolf quickly made his escape, having done no other damage than tearing Mr. Richards's clothes, and slightly wounding his arm. It was very fortunate that the requisite quantity of winter clothing formed a good defence, and that the person attacked was a powerful young man, the effects might otherwise have been more serious. Mr. Nias struck the animal once or twice with a cutlass, but without doing it any injury.

[18] The Arctic Prairies, E. T. S., 1911, pp. 225–26.

"On the morning of the 8th, the same Wolf was found round the S. E. point, frozen quite stiff. A raven discovered the position of the carcass by hovering over it after having picked out one of the eyes."[19]

Hydrophobia

Many travellers in the Far North have testified to the epidemics of hydrophobia that break out at times to thin the ranks of the Wolves. We have already noted the various records made by Alex. Henry in the article on Gray-wolf. A more complete account is given by my old friend, Buffalo Jones, who visited the Land of the Wolf in 1897. His Dogs had numerous encounters with the Wolves, and in his record is the following:

"Shortly after reaching our cabin we noticed that one of our large Dogs ('General'), next to the lead in the team, grew very quarrelsome and was continually fighting his comrades. He was quite old, and his tusks were worn off until very blunt. We had observed his strange actions while on the last of our homeward trail, but knowing he could do little harm we paid but little attention to them. He had always been peaceable, and we trusted him more than we ought; at least Mr. Rea did. I was convinced from his strange actions and the froth from his mouth that he had a genuine attack of hydrophobia. He would bite his tongue until the blood and foam would run out of his mouth in a stream, and was continually snapping at everything that came near him. When we tied him up he would howl so pitifully we could not sleep. Several times Mr. Rea got up in the night and let him loose. During the day while hauling wood, he would pull all the load himself, trying to get to the Dog ahead to fight him. It made no difference how many joined against him, the more there were the better he liked it. His teeth being so dull was all that allowed a single one to escape. He was very vicious when once aroused to anger, and had been the most faithful of our train Dogs in guarding off the Wolves.

. . . . . .

"Finally he attacked Mr. Rea, and but for his thick buckskin mittens and the blunt teeth of the Dog, he would have been inoculated with the poisonous virus. Mr. Rea grabbed his gun, and instantly put an end to old 'General's' sufferings.

"We were convinced that he had a well-developed case of hydrophobia; that he had been inoculated by the bite of the Wolf which came so near to me that night at the tent while I was out on the Muskox hunt. The Wolf, doubtless, was passing through the last stage of the dreadful scourge itself.

[19] Priv. Journ., p. 96.

I firmly believe that it is that disease which keeps the Wolves of the Barren Lands reduced in number, or they would increase so rapidly as to exterminate all ruminant animals, for they propagate fully 5 to 6 times faster than either the Caribou or Muskox; besides, they have no enemies to lessen their number, for the Indians will never kill a Wolf except in self-defence, believing that after death, one who kills a Wolf will be transmuted to that animal in the Happy Hunting Grounds."[20]

Starvation

While rabies may break out at times to thin the ranks of the White Wolf, there is no doubt that starvation is the principal and dreaded foe. Nothing but starvation would gather the Wolves together and keep them persistently hanging about what they must soon realize is speedy death, as in this chapter from the travels of Buffalo Jones.

He and his partner Rea had killed some Muskox far out on the Barrens. "That night it appeared as if all the Wolves in North America had congregated around our teepee to take vengeance on us for slaughtering these dumb brutes. At early dawn I peeped out. Every elevation, every depression, and every slope between, was literally covered with Wolves. Some stood within 4 rods of the teepee. I slipped my Winchester through the door, and selecting a large, pure-white animal, held my gun rather low, as it was quite dark, and I feared I might overshoot the mark. At the crack of the gun, the Wolf went hobbling off, but soon fell dead, as I supposed. I lingered a moment, hoping to get another shot, but the others took the hint and skulked away.

"I then went out to examine the one I thought already killed, but the moment I came near it, up it jumped and started to run. I gave him another shot and he came down. When I approached him I found both a fore and hind-leg broken; I shot him again, and he soon expired. He was a magnificent specimen, so I set myself to work to skin him for mounting.

"After I had proceeded well with the work, I was astonished to discover that the brute had eaten off his foot below the place where his leg had been broken by my first shot. No doubt, on smelling the blood that saturated his leg, his appetite could not be restrained. The foot gone, I regarded the animal as worthless for the purpose desired, so abandoned it. I had often seen Wolves, when wounded, devoured by others of a hungry pack, but this was the first time I had ever witnessed or heard of any animal eating itself. (I have inserted this remarkable instance, despite the protest of Mr. Rea, for while he declares that he personally knows it to be true, yet says no

[20] 40 Years, pp. 397–99.

one will believe it. I am determined to give facts, regardless of the opinions of the public.)

"We were astonished, when we inspected the 6 Muskox carcasses, to find that they had not been disturbed in the least by the numerous hungry Wolves."[21]

In corroboration of this story, I myself camped on Buffalo Jones's trail in 1907, and spent some days in the shanty which he built and left with his initials carved on the fireplace. He had related how the Wolves hung around near the door and could almost be clubbed. Within 20 or 30 yards of the door, I found the crumbling skulls of a dozen, and fragments of the skeletons near by showed that this was where they fell, and unquestionably they were slain by Buffalo Jones or his partner, for no other white men had wintered there since.

Another and more thrilling account of Wolves besieging Buffalo Jones's camp on the Barrens is given in the chapter on "Captivity of the Young Muskox."

The fact that Wolves are constantly weeded out by hunger is shown in the following record by Richardson:

"In the spring of 1826 a large gray Wolf was driven by hunger to prowl amongst the Indian huts which were erected in the immediate vicinity of Fort Franklin, but not being successful in picking up aught to eat, it was found a few days afterward lying dead on the snow near the Fort. Its extreme emaciation and the emptiness of its intestines showed clearly that it had died from inanition."[22]

My own experiences with the White Wolf have been but few. The most interesting was as follows:

In Aug., 1907, I was camped at the extreme north end of Aylmer Lake. My canoeman, Billy Loutit, had once or twice seen a Wolf hanging about the neighbourhood of the camp. On the morning of August 21st, there was a heavy storm of rain and sleet, so we did not rise till near 9 o'clock. Then Billy, "starved out" of his tent, got up; speedily he sang out: "Mr. Seton, here's a big Wolf out here, right by the fire."

"Bring him in here," I said, sleepily and half incredulously.

"Bang" went a gun; my tent door was opened and Billy flung on my bed the Wolf that is described in the first part of this chapter. The skin is now in the American Museum.

Dr. R. M. Anderson writes me: "I had more or less experience with *Canis tundrarum* for several years, and was beginning to be skeptical of the

[21] 40 Years, pp. 373–74.

[22] F. B. A., I, p. 64.

Mackenzie stories of Wolves coming into camp, when, toward the end of my sixth winter in the Arctic, on Feb. 10, 1915, a large white female Wolf came boldly into camp among our Dogs at breakfast time. One of the men went out and saw the Wolf walking among the Dogs. The Dogs growled a little, but made no attempt to touch the Wolf. The Wolf came toward Mr. Johansen, who was unarmed, but he shooed it away. Mr. Jenness then came out of the tent and hurled a rock at the Wolf, which promptly left the Dogs and attacked him, sinking her teeth in his left forearm. By that time, I got my rifle free from the lashings on top of the toboggan, but as Jenness was pretty well tangled up with the Wolf, it was some time before I could put a bullet through the Wolf without hitting Jenness. It was a regular comedy of surprises, as when the first man went out and called 'Wolf!' everybody thought the Wolf would be a quarter of a mile away and making for shelter before anybody could get outside. This was a little below Bloody Fall on the Coppermine River, where we were camped at the foot of a boulder bank.

"Thirteen days later, Feb. 23, at mouth of Tepee Creek, a little below mouth of Kendall River, another Wolf came up among the Dogs, which were grouped around the pot where dog-food was being cooked over an open fire. My companion was tending to the fire while I was some distance away cutting logs to make a cache. The Dogs began to snap and snarl a little, but made no concerted action. Mr. Castel called to me and I got the Mannlicher down from a tree branch near the tent, but could not shoot for some time, as a Dog would be first on one side and then the other side of the Wolf, so that I could not shoot the Wolf without hitting a Dog. Finally, at a distance of 12 to 15 feet, I shot the Wolf which had acted much like the Wolf at the Bloody Fall camp. This Wolf was also a female, more yellowish than the other one, with a blackish streak along the back. The flesh was in good condition, and was mostly eaten by the Dogs during the night, although they merely sniffed at it when the flesh was warm.

"These were two instances of unusual behaviour in one month, and never noted by me before or since. Presumably these individuals were female Wolves in heat."

His Primitive Simplicity

From the foregoing incidents, it will be seen that the fear of man is fallen on the White Wolf except when desperate with hunger. Captain Lyon says: "From all we observed, I have no reason to suppose that they would attack a single unarmed man, both English and Eskimos frequently passing them without even a stick in their hands; the animals, however, exhibited no symptoms of fear, but rather a kind of tacit agreement not to be

PLATE LXIII. THE WINNIPEG WOLF, MARCH, 1882

PLATE LXIV.—COYOTE
From specimen taken by E. T. Seton, Manitoba, December, 1882

the beginners of a quarrel; even though they might have been certain of proving victorious.[23]

This attitude of respect for man, without the terror that comes from realizing his destructive power, seems to show the primitive mind of the Wolf. It is the explanation of the ease with which they are trapped in the Far North.

The White Wolf has not been specialized by long pursuit of hunter and trapper, as has the Wolf of farther south. While it shows a respect for man—at least an unwillingness to cope with him at close quarters—its fear is not so highly developed as is that of the Gray-wolf, and its dread of a trap has not yet begun, or it could not be taken in the simple device used by the northern tribes and thus described by Captain Lyon:

The Eskimo Fox and Wolf trap "is made of strong slabs of ice, long and narrow, so that a Fox can with difficulty turn himself in it, but a Wolf must actually remain in the position in which he is taken. The door is a heavy portcullis of ice, sliding in two well-secured grooves of the same substance, and is kept up by a line, which, passing over the top of the trap, is carried through a hole at the furthest extremity; to the end of the line is fastened a small hoop of whalebone, and to this any kind of flesh-bait is attached. From the slab which terminates the trap, a projection of ice, or a peg of wood or bone, points inwards near the bottom, and under this the hoop is lightly hooked; the slightest pull at the bait liberates it, and the door falls in an instant. Foxes are sometimes taken out by hand, but a Wolf is speared as he lies confined."[24]

The following also by Captain Lyon shows that in spite of their hard and perilous lives, these Wolves do sometimes attain a green old age. "On the night of the 24th, one of these voracious creatures was shot from the ship by our indefatigable sportsman, George Dunn; it was beautifully white, a male, and of a large size; he was very old; for all the teeth, and even the tusks, were worn down to the gums."[25]

As one ponders on the lives and changing habits of the creatures that have had most contact and bitterest experience with man, the thought recurs again and again: What were these wild things like, before they met with the ever-hostile, hateful humankind? One longs for a glimpse of those far-off happy days when our Little Brothers were not afraid to be seen, and lived not ever in the withering circle of a pitiless gunfire that ceased only at dark.

[23] Priv. Journ., p. 110.

[24] As above, p. 246.

[25] As above, p. 215.

Just such a glimpse is offered by the present animal. In all respects a Wolf, the same in make-up, mind, and needs as his furtive, fearsome cousin in the woods, he gives us in his life an exact picture of what his Southern kinsman was 200 years ago. First, and in all his ways, he is simply a big wild Dog, living on flesh that he gets by open chase, recording his call on tree or corner stone, unsuspicious and friendly, wagging his tail for pleasure, or baying at the moon, more prone to attack the running than the facing foe—for all his instincts are for pursuit—unafraid of man, yet restrained by some unknown force from attacking him, very ready to become his friend, his follower, his helper, and his slave.

All this we see in the Arctic Wolf, and it used to be in the Timber-wolf, till constant warfare changed him. A truer concept will be conjured up if we call them "Arctic Dog" and "Timber Dog"; for that is all they are—big Dogs, very doggy Dogs—only a little wild.

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LIFE IX—THE COYOTE

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Coyote, Cuiota, Kyute, Prairie-wolf, Brush-wolf, American Jackal, Cased Wolf, Little Wolf

Canis latrans Say

(L. *Canis*, a Dog; L. *latrans*, barking; because it is an habitual barker, more than is any other wild Dog.)

Canis latrans Say, 1823. Long's Exped. Rocky Mts., I, p. 168.
Type Locality—Council Bluffs, Ia.

French Canadian, *Coyote.*
Cre, *Mes-cha-cha-gan-is'.*
Sauteaux, *Mes-cha-chag'-an-is.*
Ojibway, *Mes-ta-cha'-gan-es.*
Yankton Sioux, *Song-tóke-cha.*
Ogallala Sioux, *Mee-yah-slay'-cha-lah.*
Mexican, *Coyóte.*

"Cased Wolf" is the old trade name of the Coyote, because its skin was cased like that of a Muskrat, while the Gray-wolf's pelt was spread out flat like that of a Beaver.

The following, from F. W. Beechey's "Narrative" (1831, p. 403), is the earliest form of the word "Coyote" that I find in English print: "Wolves and Foxes are numerous, and the *Cuiotas*, or Jackalls, range about the plains at night, and prove very destructive to the Sheep."

The generic characters are as in the Gray-wolf, but the Coyote may be distinguished from the Gray-wolf, first and chiefly, by its much smaller size, slender build, and almost fox-like muzzle and ears; second, its general warmer sienna colour. At a distance the Wolf looks like a grayish-white animal with a small tail held high; the Coyote, a pale yellowish animal with a heavy tail held low. (See Plate LXVIII.)

Size. A very fat ♂ killed at Touchwood Hills, Sask., by Ed. Hollis, in the winter of 1901–02, measured: Head and body, 2 feet $9\frac{1}{2}$ in. (850 mm.); tail, 13 in. (330 mm.); hind-foot, $7\frac{3}{4}$ in. (196 mm.); ear, $4\frac{5}{16}$ in. (110 mm.).

Weight. During a winter's trapping near Clayton, N. M., 1893–94, I weighed a few of the many Coyotes taken, between Nov. 4 and Jan. 21, as follows: ♂ $16\frac{3}{4}$, $31\frac{1}{2}$, $21\frac{1}{2}$, $26\frac{1}{2}$, 26, 23, 25, 31, $25\frac{1}{2}$, 29, $25\frac{1}{2}$, 24, $27\frac{1}{2}$, 26, 28, 31;

29 lbs.; ♀, 21⅛, 19¼, 21, 21½, 23, 23, 21, 27, 25½, 22 lbs.; an average of 26¼ for the ♂s and 22½ for the ♀s.

The Saskatchewan ♂ measured as above was not unusually large, but it was the heaviest Hollis ever saw, weighing 42 lbs. on standard scales.

A still heavier is reported to me by George L. Rimington, of Penrith, England. He spent the winter of 1907–08 hunting Coyotes near Calgary, Alta.; out of 85 killed, the heaviest was a very large ♂ which weighed 46 lbs. on standard scales. As the date was early November, it was of course at its fattest time.

A Winnipeg specimen (♀) collected in the October of 1908 by E. W. Darbey was: Length of snout to tail-bone tip, 4 ft. 1 in. (1245 mm.); tail, 1 ft. 2½ in. (369 mm.); hind-foot, 8 in. (203 mm.); height at shoulders, 1 ft. 9 in. (534 mm.); weight, 25 lbs.

Richardson gives 3 ft. (915 mm.) as the length of the head and body of a specimen he took on the Saskatchewan.[1] In New Mexico, among a score of Coyotes of the local form (*lestes*), I found many of the above dimensions, but the heaviest, a ♂, weighed 31½ lbs.

Colour. "Muzzle dull and rather pale fulvous, finely sprinkled with gray hairs (chiefly above) and with black hairs (chiefly on cheeks); top of head from front of eyes to ears grizzled gray, the pale fulvous zone of under-fur showing through, but the gray predominating; ears deep, rich fulvous, sparingly sprinkled with black hairs; upper parts from ears to tail coarsely mixed buffy-gray and black; under parts and upper lip whitish; long hairs of throat sparingly tipped with blackish, giving the broad collar a grizzled appearance; fore-legs and feet dirty whitish, becoming dull clay colour on outer side of leg; hind-legs and feet dull fulvous on outer side, white on inner side and on dorsal surface of feet, the change from fulvous to white rather abrupt; tail narrowly tipped with black, its under side whitish basally, becoming pale fulvous on distal half and tipped and edged with black."[2]

The above colour description fits, word for word and hair for hair, the typical male Gray-wolf described in the Wolf chapter (pp. 252–3). The only difference I find on comparing many skins of Gray-wolf and Coyote is in the under-fur of the back, which usually is gray-brown in the former, and sienna-brown in the latter. There are many exceptions, however, so that we must look to the size of the animal, with its cranial and dental character, for reliable diagnosis.

The Winnipeg specimen measured above agrees fairly well in colour with this description, but has the lips fulvous, a black spot on the forepart

[1] F. B. A., 1829, I, p. 74.

[2] Merriam's Revision, p. 23.

of each fore-leg, and a large black spot on the base of the tail over the gland. The under-fur everywhere is plumbeous, except on the throat, where it is pure white.

In the New York Zoölogical Park was a beautiful specimen of an albino Coyote, a male, with wholly white coat. Another was reported killed by Frank Smith at Corral de Tierra, Cal., April, 1912.[3] The white freak is as rare among Coyotes as it is abundant among Squirrels and Deer.

While we speak broadly of the Coyote as though it were one species, it should be remembered that scientists recognize at least a dozen kinds that are closely akin, and yet have their own peculiarities and habitats. But they agree in their general style and character; the Coyotes everywhere are sons of the desert, Ishmaelites living by their wits. Further, they are alike in their vocal gifts—our Ishmaelite is also a Troubadour.

Races

Sixteen forms are recognized:

latrans Say, the typical form. T. l., Council Bluffs, Ia. This the first of the Coyotes to be discovered was, of course, the one that is found farthest East. It happens also to be the largest.

nebracensis Merriam, similar but "everywhere paler; backs of ears buff instead of fulvous; skull and teeth smaller." T. l., Johnstown, Brown County, Neb.

texensis Bailey, like *nebracensis*, "but darker, brighter coloured, and with lighter dentition; smaller, brighter, and more fulvous than *latrans*." T. l., 45 miles southwest of Corpus Christi, Tex.

lestes Merriam, very similar to *latrans* in size and colour, "cranial characters as in *nebracensis*, but skull and teeth averaging somewhat larger." T. l., Toiyabe Mountains, Nye County, Nev.

cagottis H. Smith, like *peninsulæ*, but slightly larger and redder, with somewhat shorter ears, larger teeth, and broader rostrum. T. l., Rio Frio, between City of Mexico and Puebla, Mex.

peninsulæ Merriam, like *ochropus*, but darker and richer in colour; under side of tail blacker. T. l., Santa Anita, Cape St. Lucas, Lower Calif.

microdon Merriam, small and dark with small teeth; upper surface of hindfoot whitish. T. l., Mier, on Rio Grande, Tamaulipas, Mex.

[3] Monterey American, Cal., April 27, 1912.

impavidus Allen, like *cagottis*, but much larger, not unlike *mearnsi* but much paler. T. l., Rio del Bocas, Durango, Mex.

estor Merriam, a small and very pale form, with small teeth. T. l., Noland's Ranch, San Juan River, San Juan County, Utah.

jamesi Townsend, like *estor*, but richer and more buffy, with teeth almost equal to those of *lestes*. T. l., Tiburon Island, Gulf of California, Mex.

ochropus Eschscholtz, like *latrans*, but smaller and more highly coloured, with large ears and small teeth. T. l., California, probably Tracey, San Joaquin County.

vigilis Merriam, like *peninsulæ*, but darker and more highly coloured, with more black on fore-arm and no black on under side of tail except at tip; teeth small. T. l., Manzanillo, Colima, Mex.

clepticus Elliott, a small reddish form with short skull and weak teeth. T. l., Vallecitos, San Pedro Martir Mountains, Lower Calif.

goldmani Merriam, equal to *lairans* in size, but with shorter rostrum; much paler under-fur than *vigilis* or *cagottis*. T. l., San Vicente, Chiapas, Mex.

frustror Woodhouse, whether this is a big Coyote or a small Wolf is not certain. It is much like *peninsulæ*, but larger and paler. T. l., about 100 miles west of Fort Gibson, probably in Payne County, Okla.

mearnsi Merriam. This is so different in its way of life that a separate chapter is given wherein it is fully described. T. l., Quitobaquita, Pima County, Ariz.

Range, with Map

In primitive times the Coyote was a creature of the open spaces in the great West. Its range was pretty nearly as shown on the map down to the year 1890 or 1900. The total area it originally inhabited was 3,000,000 square miles.

While most of the wild creatures of the West—nearly all of the important ones—have been reduced to ever smaller range, and are steadily dwindling in number, of the Coyote we have an entirely different story to tell. For it holds in some degree its ancient hunting grounds, and has spread as man has cleared the forests east and north; so that its range to-day is much larger than in primitive times.

MAP IX. RANGE OF THE COYOTE

By E. T. Seton, with assistance of the Biological Survey, 1923

In the long tongue south of Chicago, the Coyote is believed to be extirpated. Elsewhere it holds its original territory, though in reduced numbers, and is spreading as indicated by the black spots of which details are given in the text.

Home Range

So much for the range of the species. The range of the individual is less easy to establish. How large is the home range of a Coyote, or rather a pair of Coyotes? For we shall see that this interesting little brute is highly moral as well as clever. I should think, notwithstanding the popular notion of the Coyote as a world-wanderer, that its home range is much less than 10 miles across. After consulting many hunters and making numerous observations, I conclude that in the summer, a township (6 miles square) is more than ample hunting ground for a pair of Coyotes. In winter, perhaps, twice as much is needed in the north, and beyond this they never go of their own free will; outside this limit is foreign country to them.

Endorsement of this estimate comes from Enos A. Mills, who writes: "The home range of the Coyote is rarely 10 miles across, except on the margin of mountains where sometimes it is twice this. In many localities a pair will have 3 or 4 square miles to themselves; in other localities, there are a few pairs to the square mile."[4]

Migration

The only migration that I know of in this species is the casual one in search of shelter or better hunting. In Jan., 1883, after a three days' blizzard at Carberry, Man., the Coyotes were seen moving all day from the north to the southwest. Eight individuals I saw, and the trails in the snow told of many others taking the same course. The wind was southwest.

A. S. Barton, of Boissevain, Man., tells me that in stormy weather there is a sort of local migration of the species from the Souris Plains to the sheltered region of Turtle Mountain.

[4] Watched, p. 89.

Primitive Numbers

The average Coyote brood is 6; that is, less than the average Gray-wolf's brood. The enemies of the Coyote are the same as those of the Gray-wolf, with winter famine as the most destructive. After getting the views of many hunters and naturalists, I am led to believe that the Coyote adds to its total number about 20 per cent. per annum, and that only while *they are well within the limit of the winter food supply*. If they have reached that limit, they do not increase at all in number, only in quality. Wherever they are being relentlessly destroyed in number, they are within the limit of the winter food, and I take 20 per cent. increase per annum as safe basic figures.

"During the past two years [1897 and 1898], the State of Wyoming paid bounty on 13, 326 Coyotes,"[5] or 6, 663 each year, without appreciably decreasing the number, on her area of 97,000 square miles, about one thirtieth of the Coyote range, which, reckoning by the rate already set forth, would yield a total population of 2,250,000 scattered over the West.

"The capture of 23,208 Coyotes is reported [in 1907] from 77 national forests, which comprise an area of 106,746 square miles. This, if doubled to include the surrounding country to which the reports also refer, makes an area of approximately 213,492 square miles; or about one ninth of that inhabited by Coyotes in the United States."[6]

Since poison is freely used, this would mean a destruction of 50,000 Coyotes, and since their numbers are slowly dwindling under the drain, that means the kill is well over 20 per cent., and indicates a total of 200,000 in the Forest region, or a round 2,000,000 Coyotes in the United States. Adding one tenth for Canada and Mexico, means, in round numbers, 2,200,000 on the whole range in 1908.

We have seen that each pair of Coyotes has a home range of 20 or 30 square miles. But this does not mean that they occupy the area to the exclusion of their kind; probably the ranges of at least half-a-dozen pairs overlap on the same hunting ground, which assumes a general population of 10 to the township. These calculations would, if correct, give us a Coyote population in Manitoba of 12,000. This, it will be seen, is too low. In 1904 the Manitoba government paid bounties on 4,541 Prairie-wolves

[5] Emerson Carney: Forest & Stream, Feb. 25, 1899, p. 145.

[6] Destruction, pp. 5–6.

Plate LXV.
Skull of Coyote (estor) ♂ 1/1

Amer. Museum 1308

killed in the Province. The testimony of all observers is that the Wolves are increasing in spite of this destruction; therefore, the annual increase is greater than the annual kill; and the annual increase is only 20 per cent. This would presuppose an original population of at least 25,000, which we may safely accept as a minimum of Coyotes in Manitoba, and of course they are condensed in the southwestern half of the country (50,000 square miles), which gives 1 Coyote to 2 square miles, in flush time, say December.

That this is a low estimate the following shows: In *Shields' Magazine* for April, 1904, p. 215, Jack Comegys describes a recent Coyote drive at Evans, Colo.; about 20 square miles (half a township) were included, and some 40 Coyotes rounded up; that is, 80 to the township, or say 2 to the square mile.

Further, according to the United States Biological Survey,[7] the State of Kansas (81,700 square miles), in the year ending July 1, 1904, paid bounties on 20,000 Coyote scalps, but their numbers were not perceptibly diminished; at least as many—the Colorado evidence would say even double as many—were left, which would make the population about 30 to the township, or nearly 1 to the square mile. In the two provinces of Canada which fall wholly within the Coyote kingdom, Saskatchewan and Alberta, totalling 250,000 square miles 23,944 Coyotes were killed (official records) in the season of 1921–22. This presupposes a kill of 50,000, and since the numbers stand the strain, points to a population of 250,000, or 1 to every square mile.

Yet another gauge for approximate figures, one which shows that 1 per square mile is often exceeded: In the $10\frac{1}{4}$ square miles of the Spring Valley Water County, San Francisco Peninsula, Cal., 17 Coyotes were taken in the season of 1921–22, besides many other fur-bearers, and undoubtedly some Coyotes were left that is 1 Coyote to about half a square mile is the rate there prevailing.[8]

Thus, then, by the rate of Coyote population in Wyoming about 1898, the total of the Coyote population may be 2,250,000. By the rate in the forest area, it may be 2,000,000. By the rate in Manitoba, Saskatchewan, Alberta, Colorado, Kansas, and San Francisco Peninsula, 1 Coyote to the square mile is a safe estimate, too low for the part most densely populated, and too high for the north and wooded areas; and on the whole Coyote range will give between 2,000,000 and 3,000,000, say 2,500,000.

With these figures before me, I venture to say that the Coyote population in primitive days was at least 2,000,000. It is considerably reduced to-day, yet the diminution in the Central region is partly offset by extension into new territory.

[7] D. E. Lantz: Bull. 20, p. 9.

[8] Cal. F. & G., Oct., 1922, pp. 230–31.

The War and the Slaughter

It would be easy to cover many pages with records of slaughter in the Coyote war. A few examples will suffice.

California in 18 months, beginning 1891, paid bounties for the killing of 37,493 Coyotes.[9]

During the 18 months ending June 30, 1894, the State of California paid a $5 bounty on Coyote scalps, with the result that 71,723 scalps were presented, and with the only visible consequence, a vast increase in the Jackrabbits and other creatures on which the Coyotes feed.[10]

Bounties were paid on 19,514 Coyotes killed in Kansas (81,700 square miles) in the year ending July 1, 1904.[11]

In 1921–22, according to the official Reports (Fur Branch, Bur. Statistics) 1,969 Coyote pelts were marketed from Manitoba, so that my 1909 estimate was far below the mark, was, in fact, about half of the output. This, I take it, represents an annual kill in Manitoba of at least 5,000 Coyotes.

The total of pelts from Canada that same year was 30,551, implying a kill of about 100,000 a year.

The Modoc County, Cal. (3,741 square miles), records show that bounties were paid on 1,337 Coyote scalps during the period from Feb. 15 to Nov. 1, 1915.[12]

In 1921, Modoc County paid bounty on almost 1,000 Coyotes, many others being killed upon which the bounty was not collected;[13] so that apparently their numbers are not perceptibly reduced.

During the 5 years, July 1, 1915, to June 30, 1920, the Biological Survey reports the killing of 109,338 Coyotes in the States west of the 100th meridian.[14] That is 20,000 a year in the 1,000,000 square miles of range concerned.

During the 9 months following July 1, 1921, the official report shows 1,008 Coyotes killed and taken in California; probably 3,000 were killed, as poison was largely used.[15]

In Wyoming (97,575 square miles), during the years 1897–98, 13,326 Coyote bounties were paid; that is, 6,663 each year.[16]

[9] T. S. Palmer: Yearbook, U. S. Dept. Agri., 1896, pp. 55–68.

[10] T. S. Palmer: Jackrabbits of U. S., 1896, U. S. Dept. Agri., p. 45.

[11] Lantz: Coyotes, p. 10.

[12] Wm. S. Brown: Cal. F. & G., April, 1916, p. 112.

[13] Cal. F. & G., July, 1922, p. 192.

[14] Yearbook, U. S. Dept. Agri., 1920, p. 299.

[15] Cal. F. & G., July, 1922, p. 186.

[16] E. Carney: Forest & Stream, Feb. 25, 1899, p. 145.

The Triumph of the Coyote

And what is the result? In Kansas, where the greatest rate of slaughter took place, 1904, Lantz adds: "No diminution in the general numbers of the animals resulted."[17]

"Except in a few thickly settled regions, it has thrived upon civilization, and is practically as numerous as it was before settlements began. Indeed, in many parts of the West, Coyotes are said to be increasing in spite of a constant warfare against them."[18]

Not only is this so in the West, but in the North and in the East, as the following records show:

"Okanagan Landing, B. C., Nov. 1, 1908.—The Coyote ranges commonly far north of these localities [Ashcroft and Shuswap]. It is common at Quesnel and up the Fraser River as far, at any rate, as Fort George. I sent a specimen from this region to the Biological Survey collection about 8 years ago, which was identified by Doctor Merriam as *Canis lestes*.

"In the Lac la Hâche Valley, it is especially numerous, and I have heard of ranchers there that paid their taxes with Coyote scalps when the bounty was only one dollar per head.

"There are records, I believe, far north of any of these points at the more northern Hudson Bay posts. Wherever Rabbits are plentiful and the snowfall not too heavy, Coyotes are pretty sure to occur.

"It may perhaps be interesting to note that about the year 1893 Coyotes appeared in the Fraser Valley at Chilliwack, west of the Cascade range, and only 60 miles from the coast line. I saw an undoubted specimen that was killed there in 1897. Since then they have almost disappeared from that section. In no portion of the Province are they confined to the 'arid regions.' They are even found regularly in the summer and fall above timber line on the highest mountains."[19]

J. D. Figgins tells me that they are abundant now (1922) in Stickeen River Valley, mostly about Telegraph, Creek County, B. C.

Ever farther north they have pushed their way. In 1907, Madison Grant secured a complete skin and skeleton of a Coyote killed near Whitehorse on Alsek River, Alaska, in February of that year. Dr. J. A. Allen examined the specimen and found it closely related to *lestes*. The spot near the Alaskan boundary marks this record.

In the interior their progress has been nearly the same.

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[17] Coyotes, p. 9.

[18] As above, p. 8.

[19] Allan Brooks: Forest & Stream, Nov. 21, 1908, pp. 812–13.

In 1897 they were unknown at Fort McKay on the Athabaska. About 1902 they first appeared, and in 1907 were numerous.

On my northern journey I found that, though unknown in 1900, the Coyote had pushed forward to Lac la Biche and along the river valley to Fort MacMurray, where they were abundant in 1907; and still farther till they were of regular occurrence on the south shore of Great Slave Lake at the time of my visit (1907).

"In 1903," according to E. A. Preble, "Merritt Cary was informed by William McLeod that 2 Coyotes were killed near Fort Nelson, on Fort Nelson River, about the year 1898. During my stay at Fort Simpson, I received confirmatory information from several persons who had formerly resided at Fort Nelson, regarding the occurrence of the Coyote at that place.

"Tyrrell reports shooting a Coyote on a small lake near the source of Foster River, about 200 miles southeast of Athabaska Lake, in the summer of 1892."[20]

"J. Alden Loring reported this species common at Edmonton in Sept., 1894. In 1895 he found it abundant in the foothills of the Rockies in western Alberta, and shot one at Jasper House on Aug. 30. In July, 1896, he occasionally heard Coyotes in the mountains 15 miles south of Henry House, but the animal was less abundant there than in the foothills to the eastward. In the early autumn, while making a trip from Jasper House northward to Smoky River, he heard the animals nearly every night, and took a young one at Strawberry Creek 14 miles north of Jasper House, on Aug. 23. In October of the same year, he saw Coyote tracks in Caribou Basin and Rodent Valley, and obtained skulls at Prairie Creek and Whitemud to the eastward of Jasper House."[21]

And ever northward march these clever little Wolves, till now "Stefansson says that Coyotes for the first time in history have appeared in Arctic Red River within 100 miles of the polar ocean."[22]

In Manitoba, it prefers the untimbered portions of the north temperate regions, but is far from confining itself to the open country. The woods from Pembina to Riding Mountain, as well as immediately east of Winnipeg, are now well supplied with the species. I found it abundant about Lake Winnipegosis on the east side of the water, even where fully 100 miles in direct line from open country. And northwesterly, its range extends into the forest 500 miles to Great Slave Lake. It is never found, so far as I can

[20] Ann. Rep. Can. Geol. Surv., VIII, new ser., p. 13D, 1896.

[21] Preble: N. A. F., no. 27, 1908, p. 215.

[22] Field & Stream, April, 1919, p. 928.

PLATE LXVII.—COYOTE HEAD

Life study made by E. T. Seton, in Jackson's Hole, Wyo., September 1, 1898

PLATE LXXII.—YOUNG COYOTES

No. 1.—A litter of pups in the New York Zoological Park, from photograph by Elwin R. Sanborn

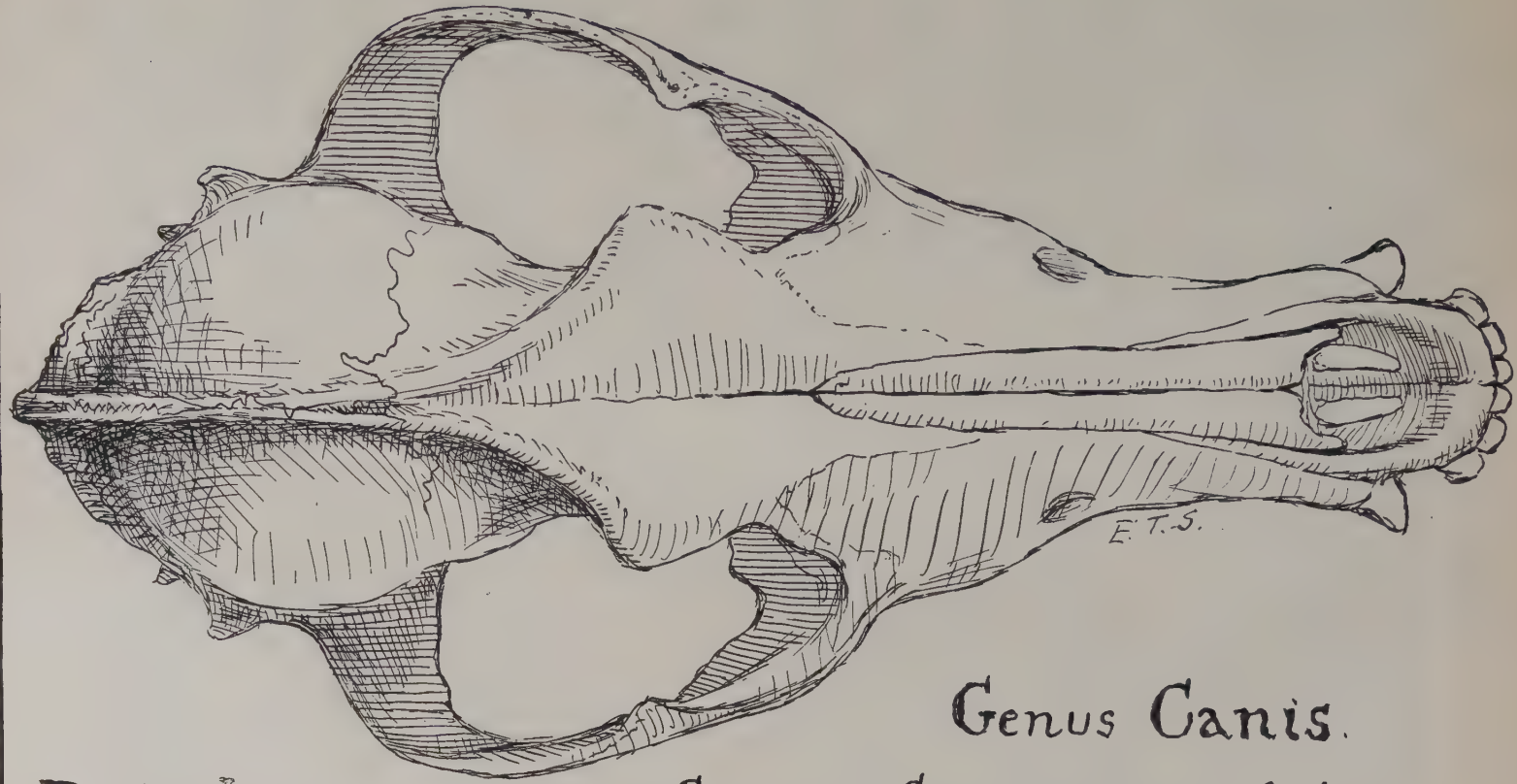
No. 2.—Tame Coyote, 3 months old, from photograph by Harold Gibson of Carnduff, Sask.

Nos. 3 & 4.—Young Coyote, 4 months old, Winnipeg, 1905. Photographs by E. T. Seton

No. 5.—Coyotes nearly full grown. Photograph by William A. Bartlett of Nebraska

Courtesy of *Forest and Stream*

Amer. Museum 1308



Genus Canis.

Plate LXVI. Skull of Coyote (estor) ♂ 1/1

learn, in the northeastern or coniferous region of Manitoba, but it is more or less plentiful in all the southwestern half of the Province.

In Minnesota, where once it was confined to the prairies, it has worked easterly and is now abundant as far at least as Duluth.

In the woodland State of Michigan, the same progress is to be seen.

J. E. Fischer reported in 1920 that Coyotes had appeared and become numerous in the region at the north end of Lake Gogebic within the last few years.[23]

In 1911, Dec. 8, at Flint, Mich., I was shown a very big fresh-killed Wolf or Coyote, taken in Crawford County. I was on a flying visit through the town and saw the an mal for a few minutes only. It weighed probably 50 pounds, and looked like a cross between a police Dog and a Coyote; but I had no good chance to examine it and the owner would not sell it, not even the skull; however, I got a good photo of the creature.

Also, Norman A. Wood records it from Dickinson, Gogebic, Alger, Menominee and Marquette in the Upper Peninsula; and from Jackson, Monroe, Cass, Kalamazoo and Wayne in the Lower Peninsula.[24]

So that the State of Michigan is being possessed by two streams of immigration, one north and one south of Lake Michigan. Evidently Wisconsin is the breeding ground that is stocking the east with Coyotes.

Writing of the Coyote in Iowa (1911), Frank C. Pellett says that in 1867, Dr. J. A. Allen visited Iowa and described the Coyote as formerly quite numerous but in some sections now nearly extirpated; however, still common in the south part of Guthrie County. "From that time on until about 1890, Coyotes steadily decreased in numbers, until, apparently, they were all but exterminated. The survivors were extremely cunning, and an adult was seldom presented for bounty. During the last few years, a marked change is taking place. The country is now thickly settled and there seems little shelter for such large animals as Wolves, yet the Coyotes are increasing in numbers."[25]

He is coming back, he has solved the new riddle of life and is repossessing the ancient hunting grounds of his people.

Walter L. Hahn says: "There is no doubt that the Coyote has increased in numbers and extended its range in northern Indiana during the past 10 years."[26]

[23] Dice & Sherman: Mamm. Gogebic, Mich., no. 109, Mus. Zoöl., Univ. Mich., Feb. 25, 1922, p. 37.

[24] Annot. Check List of Mich. Mamm., Univ. Mich., April 1, 1914, p. 8.

[25] Forest & Stream, Mar. 25, 1911, p. 450.

[26] Mamm. of Kankakee Valley, Proc. U. S. Nat. Mus., June 15, 1907, XXXII, p. 462.

Even into Ontario has this enterprising prospector sent his scouts. A wild specimen was taken at Bosanquet, a few miles north of Thedford, Lambton County, Ont., Jan. 10, 1919, by George A. Martelle. The hunter took it for a Timber-wolf, but the skull and skin were secured and it proved to be the big Prairie-wolf, *Canis latrans*, a male. It is now No. 3877 in the Victoria Museum.

According to *Field & Stream*, June 1920, p. 159, "Prof. A. B. Recknagel, of Cornell University, reports that the first Coyote ever killed in Tompkins County, N. Y., was recently taken near Ithaca." There is, however, a possibility that this was an escaped captive

In the New York *Times* for Jan. 9, 1922, is an account of 2 Wolves in New Jersey. They were killing Pigs and, from the description, were either Coyotes or police Dogs.

A much more satisfactory record comes from Maryland. "On Feb. 5, 1921, an adult male Coyote was shot 5 miles northwest of Poolesville, Montgomery County, Md., by Mr. John A. Jones. The animal had been seen by several people in the region at various times since early in the winter, but it had successfully evaded guns. Its chances of living were lessened, however, when it became friendly with a female Airedale Dog, lost some of its wariness, and frequently came near the farm buildings where the Dog lived.

"It was killed with a shotgun in a field on the farm."[27] Another brave Samson betrayed by his Delilah.

It is not known whether this was an escaped captive or a traveller from the West. The skin is now in the U. S. National Museum.

Marriage Customs

It is the opinion of all persons familiar with its habits, that this animal, like the Wolf, is strictly monogamous. It is usually seen single or in pairs, mostly in pairs. Every scrap of recorded evidence that I can find, as well as all my own observations, go to prove that, winter or summer, it is the rule for 2 Coyotes, a male and a female, to run, hunt, and live together. Several times I have taken the pair at the same time in a setting of four traps 10 or 12 feet apart, around a buried bait, showing how closely they kept together, though this was during the months of November, December, and January.

Even the pack of 6, later described by L. Wilmot, were in 3 pairs. And since this union holds the year round, we may safely infer that the species, like the Gray-wolf, pairs for life.

[27] Hartley H. T. Jackson, Journ. Mamm., Aug., 1922, pp. 186–87.

As a natural corollary, the male helps in raising the brood.

A. S. Barton says that the male aids the female with the young, at least till they are able to leave the den. In autumn, male and female are always found together, but he never saw the whole family together at this time as is the case with the Gray-wolf. The young may have scattered, or those observed may have been a barren pair; such are frequent.[28]

The actual mating season is about the middle or during the last two weeks of February.

Den

Their usual denning place is one dug by the Coyotes themselves, in some sunny bank, but they may use an abandoned Badger hole. In any case, it is the mother who selects the den, and is credited with ownership of it—an interesting illustration of basic law.

The entrance is about 10 by 20 inches and is commonly concealed in the bushes. The actual nest is sometimes lined with a little grass and fur, and sometimes is quite bare. Barton sends the accompanying plan and description of one which he examined near Boissevain, Man. (Plate LXXI.)

Apparently it had been dug by the present owners, and was much the same as the dozen or so others he had investigated. The air-hole, located after close search was, as usual, an old Gopher hole, enlarged from below and directly over the nest; he supposes it was made to admit fresh air to the cubs.

I have not seen this ventilator, but may have overlooked it, as I had not heard of such a contrivance when last I examined a Coyote's den. It is well known that a family will have several dens, some of which are, as Barton says, "sleeping places for use during the heat of the day, which is one reason why so many attempts to dig out Coyote dens often fail of results."[29]

Writing of the Coyote in California, Dixon says:

"Breeding dens are carefully selected by the female with a view to effective concealment. The dens are thus usually difficult to locate, unless the female is watched or her tracks to the den are followed The location and construction of the den vary with the topography of the country, as will be seen by the following instances At Redrock Valley, Siskiyou County, on June 7, J. O. Miller found a Coyote den. . . . This den was located in the base of a dead fir stub about 20 feet high and 4 feet in diameter at the ground. The centre of the stub was rotten and the nest chamber, $3\frac{1}{2}$ feet in diameter, had evidently been dug out entirely by the

[28] Personal information.

[29] Letter.

parent Coyote. The single entrance to the den was through a hole 15 inches in diameter at the base of the stub. No nest material other than the dry earth and rotten wood was noted in this den.

"At Earlimart, Tulare County, May 21, George Towne found a Coyote den on the bare open plain. The distance from the mouth of the burrow to the nest cavity was 26 feet. There were several lateral extensions of the burrow and the greatest depth reached was $5\frac{1}{2}$ feet. The top of the nest cavity was less than 2 feet below the surface of the ground." It was some 3 feet in diameter.[30]

The den has other uses besides its nursery or main purpose. The father needs a den of his own—a bachelor apartment—when he is not an acceptable member of the home group. The mother may need another den. She does not wish to be pestered with the pups the whole time, and other nursery dens are needed for a change-off, probably to help in getting rid of insect parasites.

Mills says: "The Coyote usually lies up in a den when not hunting; but at times he simply hides in underbrush or in ravines. A den I measured lay nearly 4 feet below the surface and had a length of 14 feet. It was expanded into a room-like place near the farther end, and there were a number of small pockets extending from it. The den may be made by the Coyotes themselves, or it may be the den of a Badger which they have re-shaped. Occasionally, they take advantage of cave-like places between large stones. The den commonly is in an out-of-the-way place and the entrance to it is concealed by stones or bushes."[31]

Young

The carrying time of the young is the same as in the Wolf and the Dog; that is, 63 days.

Usually the young are born during the first half of April. April 9th in the New York Zoölogical Park and April 20th in the Washington Zoo represent the extreme dates at hand, though the hunters say that May litters are not unusual.

They number from 3 to 10, but are usually from 5 to 7.

They are blind and helpless, but covered with close, dark, ash-coloured fur.

It is generally believed that the father is not permitted to enter the home for some days after their birth—until, indeed, the young ones' eyes are open. But I have not been able to confirm this belief.

[30] Control of Coy., 1920, p. 383.

[31] Watched, pp. 89–90.

It is sure that he is never far away, and his devotion is vouched for by all who know him.

"Repeatedly," says Mills, "I have seen a mother or a father Coyote lure a hunter or trapper away from the den or spot where the young were hidden."[32]

Dr. W. T. Hornaday informs me that the father of the brood born April 9th took a keen interest in the young and became very officious, even vicious, in their defence. Their eyes opened on the eighth and ninth days, variously. When about 3 weeks old, the mother would carry them out into the sun or about the yard and back again. At 5 weeks, they were old enough to walk out alone.

At about 6 weeks, they show all the cunning ways and playfulness of puppies. They spend hours outside the den, wrestling, tusselling with old bones, digging, or sleeping in the sun, but are not known to venture forth at night.

How the den is sanitated at this time is not known. Possibly it is not purified. It may be because of its becoming foul or pest-infected that the mother moves the young to one of the other dens.

Keeper Carson assures me that in the Philadelphia Zoo, where the Coyotes frequently breed, the mother disgorges food for them regularly, exactly as does the mother Gray-wolf. When some 6 weeks old, both parents begin to bring solid food to the little ones, and the entrance to the den becomes littered with feathers, fur, bones, and other remains of their prey.

The young are so keen to see and welcome father and mother back with the new catch, that they make little pathways from the den to all the near points that give a view. Here they will sit and watch, but are ever ready to scurry home on the slightest alarm.

A glimpse of their life at this time was secured by Professor John Macoun, of Ottawa, Ont., while exploring near Crane Lake, Sask., in 1884. On June 23, he came on a Coyote family—father, mother, and at least 3 young ones. At his approach all ran into the den.

Barton tells me that as they get older, the cubs scratch out little pockets leading from the main den. In digging after them, these are frequently covered over and escape notice, so that some of the little ones are never found.

Similar testimony comes from Enos A. Mills, who says: "In 2 dens I examined, each youngster had a separate compartment or pocket for himself; and, judging from claw marks, probably he had dug this himself."[33]

[32] Watched, p. 85.

[33] As above, p. 90

I have a most interesting photograph by William R. McFadden, of Denver, showing 9 young Coyotes playing about the door of their den. This was taken in June. The young were about one third grown; both parents were seen in attendance and when they found that their home was discovered, they moved the young ones elsewhere. (Plate LXXIII.)

This habit is quite general among Coyotes. Barton writes that on May 21, 1905, he found a den in a ravine a mile out of Boissevain, Man. The mother was running around, and the pups were squealing deep in the hole. But when he went back next day to dig them out, the litter had been moved, evidently to a distance, for a careful search in the neighbourhood failed to locate them.

A similar habit is recorded by Dixon.[34]

In July the young are half-grown. They now begin to run with their parents and learn the arts of hunting. At this season the mother especially guards and trains them carefully. Her warning call of danger is a very distinctive cry.

The Heroic Little Mother

Some delightful glimpses of their family life at this time are recorded by Enos A. Mills, whose opportunities were as rare as his gifts. On one lucky occasion he says:

"Nine healthy Coyote puppies were playing in the sunshine with all their might. After days of searching I had at last discovered their den. The puppies had not noticed me and I enjoyed watching their training for the game of life. They wrestled, played at fighting, rolled over and over, bit at one another's feet and tails, and occasionally all mixed in one merry heap.

"Their mother came along the hillside above the den. She walked back and forth on the skyline where I could not miss seeing her. Then she came nearer and passed within 30 or 40 feet of me. I kept my eyes upon the puppies and pretended not to see their mother. She turned and passed still closer to me. This time she was limping badly on one forefoot and holding up one hind-foot. She was making every effort to have me follow her—to lure me away from her home and her puppies.

"A moving object down the slope caught the attention of the puppies. As soon as they made out what this was, they scampered racing away. Going only a short distance, they sat down, as though at a dead-line. Evidently there is a small zone of safety surrounding the den beyond which the puppies are not allowed to go. At this moment, Mr. Coyote appeared from

[34] Control, p. 383.

down the slope, with a Jackrabbit in his jaws. He was coming quickly along and had not suspected my presence. How eagerly the puppies watched him! As he came up, they commenced snapping and tearing at the Rabbit he carried. Mrs. Coyote hastily joined them and all scurried into the den. The following morning the den was deserted. It is common for Coyotes to move their puppies promptly to another den when they think they are discovered.

"Another mother Coyote decoyed me into watching a vacant den. Her children were in another den a quarter of a mile away. In carrying food to them, she went out of her way to enter the vacant den, then left it by a different entrance and proceeded by a circuitous route to the waiting puppies. Both of the old Coyotes hunt and carry food to the den for their puppies."[35]

By the first of August the den is deserted, and now, apparently, the young scatter and shift for themselves, never travelling or hunting in a pack as do the Gray-wolves.

There is evidence, however, that the motherly care continues, for Barton tells me that on one occasion he was hunting a young Coyote, when the mother coursed along a neighbouring height, uttering the prolonged, quavering squall, or danger-call. Barton had 2 foxhounds in leash. They were after her and very brave as long as she ran away, but a few minutes later came racing back toward him in terror, closely *pursued by the heroic little mother*. They were so embarrassed by the leash, and she was so active, that she ran around and bit them as often as she chose. Imagine the fight—a 25-pound Coyote against two 75-pound Dogs, with the Dogs in disastrous defeat!

In October, the young are as big as the parents. Food is still abundant on the Northern prairies, although the Ground-squirrels have retired to their winter quarters. The Coyotes are sleek and fat, but from this time on the struggle for life becomes hard and deadly.

Wolves, it is well known, do not breed till 2 years old, and it is most likely that Coyotes are governed by the same law.

In the North, one litter each season is the fixed law, so far as I can discover. But in California, they seem to have a more prolific breed; the following, by Dixon, is a surprise:

"Second litters . . . are not unknown. A female Coyote, taken by the author in the vicinity of Bakersfield, Kern County, on May 6, 1918, showed plainly that she had nursed young within the previous 24

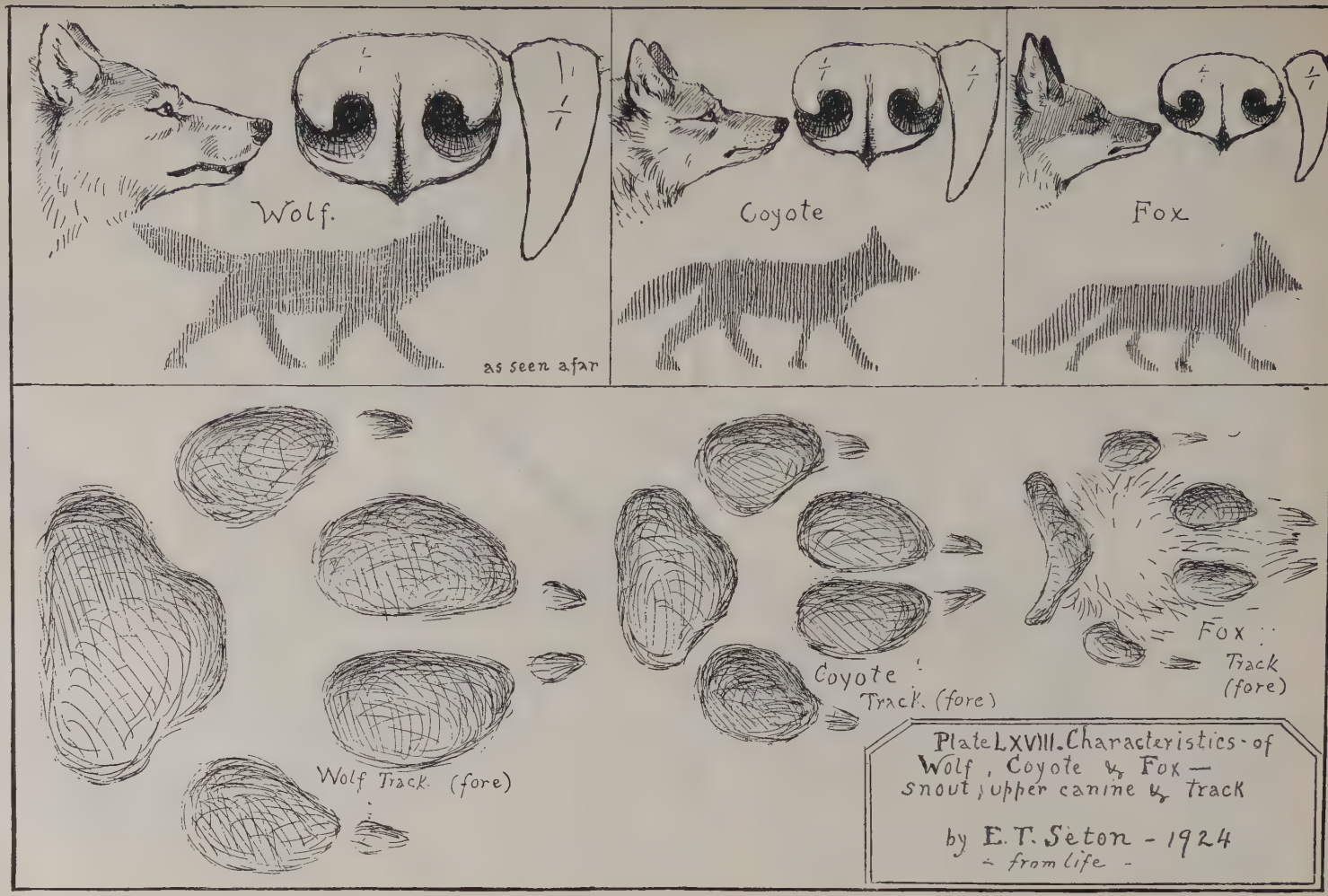
[35] Watched, pp. 84–85.

PLATE LXXIV.—COYOTE IN WINTER COAT IN NEW YORK ZOOLOGICAL PARK
From a photograph by Elwin R. Sanborn

PLATE LXXV.—COYOTE DEN. IN THE SANDHILLS, CARBERRY, MANITOBA
From a photograph by E. T. Seton

PLATE LXXIX.—THE RELAY CHASE

To illustrate the Coyote's manner of combining drive and ambush with relay chasing, without which they could not capture the swifter Antelope


Wolf.
as seen afar
Coyote
Fox
Wolf Track. (fore)
Coyote Track. (fore)
Fox Track (fore)
Plate LXVIII. Characteristics of Wolf, Coyote & Fox — snout, upper canine & Track
by E. T. Seton - 1924
- from life -

hours, and there was still an abundance of milk in the milk glands. This nursing female contained 7 small embryos, each less than an inch in length. This specimen (Mus. Vert. Zoöl. 28722) affords a reasonable basis for the statement that 2 litters may sometimes be raised in one year."[36]

Age

The ordinary expectation of life in the Coyote—five times the period needed for growth—should be not more than 10 years. But they often exceed this. Enos A. Mills says: "I kept track of one for 8 years, who appeared mature when I first met him and showed no signs of decay when I saw him last."[37]

In the National Zoo at Washington, they had a female which lived for 14 years, although adult at arriving.[38]

Let us pray that every blithe and joyous Coyote in the West to-day may scoff at government hunters and greedy trappers, and live to the full his adventurous tale of days.

His Meat

While a hunter by profession and by choice, there is nothing in the way of fish, flesh, or fowl, dead or alive, ancient or modern, that the Coyote disdains for food. Ground-squirrels, Mice, Rabbits, frogs, snakes, eggs, and fledgling birds are on its bill-of-fare, and the hen-yards as well as the sheep-folds are levied on in times of need.

In the great dry Southwest, it finds, besides big-hoofed creatures, an abundance of small rodents, birds, reptiles, fish, and crustaceans.

"Three horned toads (*Phrynosoma*) were found in the stomach of a specimen killed June 3, 1898, in Big Smoky Valley, Nevada, by Vernon Bailey. On the low tropical coast of eastern Mexico and Texas, members of the Biological Survey have often seen Coyotes searching the beach for crabs, fish, and turtle eggs."[39]

In the Northwest, he finds a plenty of Mice, Ground-squirrels, and in the early summer, eggs and small birds. In the winter his precarious living is chiefly on winter-killed Cattle, Horses, and Sheep.

On the Athabaska River in the October of 1907, I found the tail-feathers of a Chipmunk in the dung of a Coyote. I wonder if the rest of the Chipmunk got away.

[36] Control, p. 382.

[37] Watched, p. 89.

[38] Rep. Nat. Zoo., Wash., 1920, p. 80.

[39] Coyotes, p. 12.

Enos A. Mills says: "In certain localities, the Chipmunks retire in autumn to their holes, fat and drowsy, and temporarily fall into a heavy sleep. Before the earth is frozen, they are energetically dug out by the Coyotes."[40]

On another occasion, after following a Coyote for days, to learn his way of life, Enos A. Mills wrote: "Tracks and records in the snow showed that for 2 days a Coyote did not capture a thing to eat During this time, he had travelled miles. He had closely covered a territory about 3 miles in diameter. There was game in it, but his luck was against him. He was close to a Rabbit, grabbed a mouthful of feathers—but the grouse escaped—and even looked at a number of Deer. At last, after more than 2 days, and possibly longer, he caught a Mouse or two."[41]

The winter is, of course, the season of peril for all creatures that do not store up a full supply of food, or hibernate. Can it stand the winter? is the crucial test of species that move North. Probably the chief thing that carries the Coyote race through is the new supply of food brought in by their enemy —that is, winter-killed Sheep and Cattle. These are dragged forth from time to time, and at each carcass half-wild Dogs contend in nightly feast with Coyotes, or both retire while a big Gray-wolf fills his capacious maw.

Even in the summertime he may be plagued with an empty and complaining belly and be glad from choice or love of change to make some wholly new entry on his list of diet—insects and fruit, no less.

In California I saw many melons eaten into by Coyotes. When I visited John Muir on his ranch at Martinez, Oct., 1899, I saw many signs of Coyote damage and many tracks right in his garden.

In the Far North, on the Athabaska River, I found the Coyote's dung in October composed chiefly of seeds of the *uva-ursi*.

Sample dung-pellets gathered on the Athabaska River, Alta., in late October, 1907, were sent to the Biological Survey at Washington for analysis. The following remains in them were identified by Edward A. Preble and W. L. McAtee:

Rosa (*acicularis?*), many seeds; *Ribes*, a great many berries; *Aralia nudicaula*, many berries and seeds; *Microtus drummondi*, some hair (apparently) and portion of skull; *Peromyscus*, incisor (apparently *Peromyscus*); fish, portion of skull of some fish; waterbeetles (*Corixa*), remains of a good many; grasshoppers (*Melanoplus borealis*), remains of about 20; ant, head of one.

Lantz says in his report:

"The stomachs examined contained mainly animal matter, but in 2

[40] Watched, p. 93.

[41] As above, p. 166.

cases, vegetable remains were found. One examined by Vernon Bailey contained a quantity of ripe cultivated plums, and William Lloyd found a Coyote that had eaten mesquite beans. In northern Arizona, Doctor Merriam saw a Coyote eating a watermelon, and a correspondent at Russell, Kans., says that they sometimes eat ripe melons. In California they eat peaches, apricots, grapes, and other fruits. They eat also juniper berries, manzanita berries, and the fruit of the prickly pear (*Opuntia*).

"Only one case of insect-eating has been observed by the Biological Survey. The same animal that had eaten plums had in its stomach the remains of a large cricket (*Stenopelmatus fasciatus*).[42]

Dr. A. K. Fisher testifies: "At times the Coyote feeds entirely on large insects, as May beetles, crickets, and grasshoppers, and accomplishes much good."[43]

To this Dixon adds: "In San Diego County, a Coyote observed by the author, jumped up and snatched ripe fruit from the lower branches of a prune tree. Ripe grapes and watermelons were commonly eaten by Coyotes in this locality."[44]

His Prairie-dogs

In the October of 1893, while living in New Mexico near Clayton, I had an opportunity of watching a joint hunt of Prairie-dogs by 2 Coyotes, no doubt a pair. Early in the morning I was on a rugged hill overlooking a plain on which was a Prairie-dog town One Coyote was in an arroyo or dry watercourse hidden from view. The other walked openly and calmly toward a Prairie-dog that was barking vigorously on its mound. The Coyote paid little heed, but walked so as to pass within 20 yards. The Prairie-dog dodged down. Then Coyote No. 1 continued his leisurely walk, while Coyote No. 2 rushed forward and hid behind another mound. Very soon the Prairie-dog began to peep out, and seeing the Coyote at a safe distance, he scrambled on to his high outlook to hurl defiant little barks after the foe. But the Coyote behind sprang and all but caught him before he scrambled into safety.

In this case the combination failed, but evidently it must oftentimes succeed.

Dr. G. B. Grinnell has given an admirable description of the Coyote as a stalker.

"Last summer," he says, "while we were haying, an interesting ex-

[42] Coyotes, pp. 11–12.

[43] Yearbook, Dept. Agri., 1908, p. 189.

[44] Control, p. 382.

ample of a natural pointer was seen not far from the house. The loaded hay wagon was coming back from one of the meadows, when a Coyote was seen 40 or 50 yards from the road, apparently on a dead point. He was standing absolutely still, his nose and tail straight out in a line, and one forefoot lifted from the ground. Just before him there was a very slight rise of ground, but the men who were riding on top of the load of hay could see over this, and saw that he was pointing a Prairie-dog which was feeding near its hole, just on the other side of the elevation. They were so interested in the sight that they stopped the wagon and watched. Every little while the Prairie-dog would sit up and look about, and when he did this the Coyote would stand absolutely without motion. When the Dog dropped down on all four feet and began to feed, the Coyote would very slowly and stealthily creep up a few feet nearer. This thing went on for some minutes, the Dog not seeming to notice the Coyote, which at the last must have been in plain sight. The last time the Dog dropped down to feed, the Coyote made a swift rush, covering 12 or 15 feet, picked the little animal up, and then for the first time noticing the hay wagon, stood for a moment with his prey hanging across his mouth and then trotted slowly off up the hill."[45]

Lantz says of the same game:

"The Coyote captures them by hiding behind clumps of weeds or bunches of grass at some distance from the burrows. When the unsuspecting rodent, in feeding, approaches near enough, a few leaps enable the Coyote to secure it. The grass in a Prairie-dog 'town' is usually cropped very short, and all tall-growing weeds are cut down.

. . . . . .

"But clearing the Prairie-dog town of weeds is not sufficient to baffle the Coyote. In the absence of hiding places he takes to new methods of hunting. J. H. Gaut, of the Biological Survey, records his observations in a Prairie-dog town in New Mexico:

"'The Coyote started at one end of the town and ran at lightning speed in a straight line until he cut off one from its burrow. When the Prairie-dog saw that it could not get to its hole, it stopped and began to kick until the Coyote caught it and killed it in very much the same way that a Dog kills a Rat.'"[46]

His Antelope-jacks

Thus I have given the little and least chapters of his daily life, but he has big and sporting instincts that lead him to kill bigger and nobler game.

[45] Forest & Stream, Dec. 26, 1896, p. 511.

[46] Coyotes, pp. 12–13.

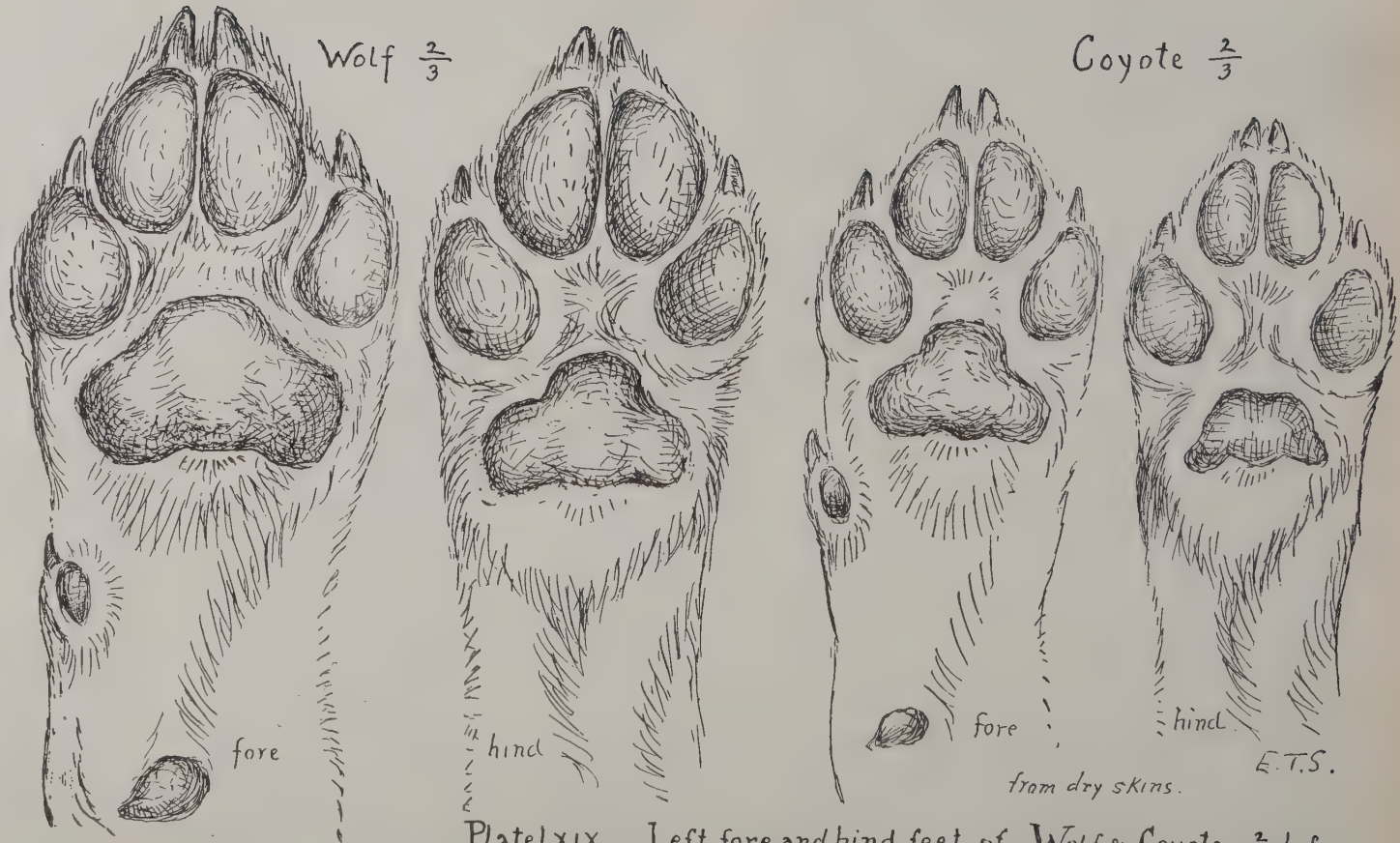


Plate LXIX. Left fore and hind feet of Wolf & Coyote 2/3 life

In the chapter on the Antelope Jackrabbit is related the method by which these crafty little Wolves secure that beautiful creature of the dull wits and the wingéd heels.

Lantz also says of the Coyotes:

"Sometimes they have been known to hunt Jackrabbits in company. While a single Coyote would not be able to run down a Jackrabbit, by hunting together, taking turns in the drive, and by taking advantage of the tendency of the Hare to run in a circle, they are able to capture it. Eyewitnesses to such a performance state that they do not fight over the division of the Rabbit's carcass, but they all obtain a share."[47]

As a Sheep-killer

Coyotes rarely molest Pigs, and calves only when other game is scarce and the calf very weak. But they are very troublesome among other live stock. In the summer they kill many turkeys that roam afield far from the protection of the house Dog, and Sheep are particularly subject to their inroads. They have, indeed, nearly put an end to wool-raising in the Province of Manitoba. They destroyed all Barton's Sheep, invariably selecting the fattest and best. At first it was found sufficient to put bells on several of the flock. But the Coyotes have got so far accustomed to these that the bells now protect only the Sheep that wear them; some shepherds aver that these sagacious little Wolves will get up at night and listen for the Sheep bells, so as to know where an easy supper is awaiting them.

George H. Measham writes me from Shoal Lake in Dec., 1899: "Wolves are on the increase and becoming a regular pest. Many people have abandoned keeping Sheep on their account. Although a bounty of $2 is paid for them, they manage to keep out of danger in a way only equalled by themselves."

When man brought his myriads of wool-bearing id ots into the Coyote country of the Southwest, it was, of course, like throwing a crate of chickens into a Fox's den. Coyotes certainly kill lambs when they can find them.

The Chief of the Biological Survey says: "Coyotes in New Mexico were reported taking 3 to 6 lambs each night from one ranch, notwithstanding the fact that the Mexican herders were sleeping in close proximity, and that the usual devices were employed to keep the an mals away. After a Bureau hunter had killed 7 large old Coyotes and 2 Wildcats in the vicinity, the losses entirely ceased."[48]

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[47] Coyotes, p. 12.

[48] Rep. Chief Bur. Biol. Surv., Washington, Sept. 4, 1920, p. 4.

In contrast to this is the following by Ranger Gray of California Game Refuge:

"Earl Moore, T. Flournoy and other men who have been handling Sheep for many years in these mountains advise me that they never saw a Coyote actually kill a Sheep. However, they state that they have seen them driving and worrying the Sheep, and upon following the trail they invariably found dead Sheep scattered along the route. The greatest losses among this class of stock from the source mentioned is to small bunches separated on the range from the main bands, and left on the range during the night unprotected."[49]

Before we judge the Coyote guilty of all Sheep-killing that takes place where there are no Gray-wolves, let us remember that in 1891, the loss from Dogs in Ohio was placed at $152,034 and $200,000 in Missouri.[50]

"Although Wolves [Coyotes] have done serious injury to Sheep owners in this State [Iowa], the worthless Dogs that roam freely about the country have done *ten times more*. A bounty placed on the head of every Dog not wearing a collar with his owner's name on it, and a bond to make every Dog owner responsible for his mischief, would do more for the local Sheep industry than anything else that could be mentioned."[51]

If we condemn the Coyote to death for sheep-stealing, we are in decency bound to hang all the Dogs on the bigger branches of the very same tree.

As a Cattle-killer

Full-grown Cattle and Horses are safe from Coyotes' attacks. But the new-born calves are commonly killed when the mother leaves them to seek water.

On Oct. 3, 1901, while driving near Meeker, Colo., I saw a cow defending her new-born calf from a Coyote. The calf was able to stand, and 2 or 3 steers lent some aid to the cow. The Coyote walked about openly and quietly, or sat on his haunches some 20 yards away. The cow and steers went on feeding, but kept an eye on the Coyote, and the mother always managed to be between the calf and his foe. Occasionally one of the defenders would throw up his head, shake his horns, snort, and even run a few steps at the Coyote, but there was a marked absence of action in the little drama. Doubtless it would continue so, unless the sagacious little sport got a chance to rush in and inflict a deadly wound.

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[49] E. V. Jotter: Deer-killing by Coyotes, Cal. F. & G., Jan., 1919, p. 27.

[50] Sheep Industry in the United States, U. S. Dept. Agri., 1892.

[51] Frank C. Pellett: Forest & Stream, Mar. 25, 1911, p. 450.

As a Deer-killer

When Deer are vigorous and not rendered helpless by deep snow, they have little to fear from the Coyote. But the time of Coyote famine and Deer helplessness unfortunately come together in California, at the end of winter when the snow is deep, or early in spring when the Deer are worn out with the long siege of it.

E. V. Jotter makes a long report on Deer-killing by Coyotes in the *California Fish & Game* for Jan., 1919, pp. 26–27, from which I make these extracts:

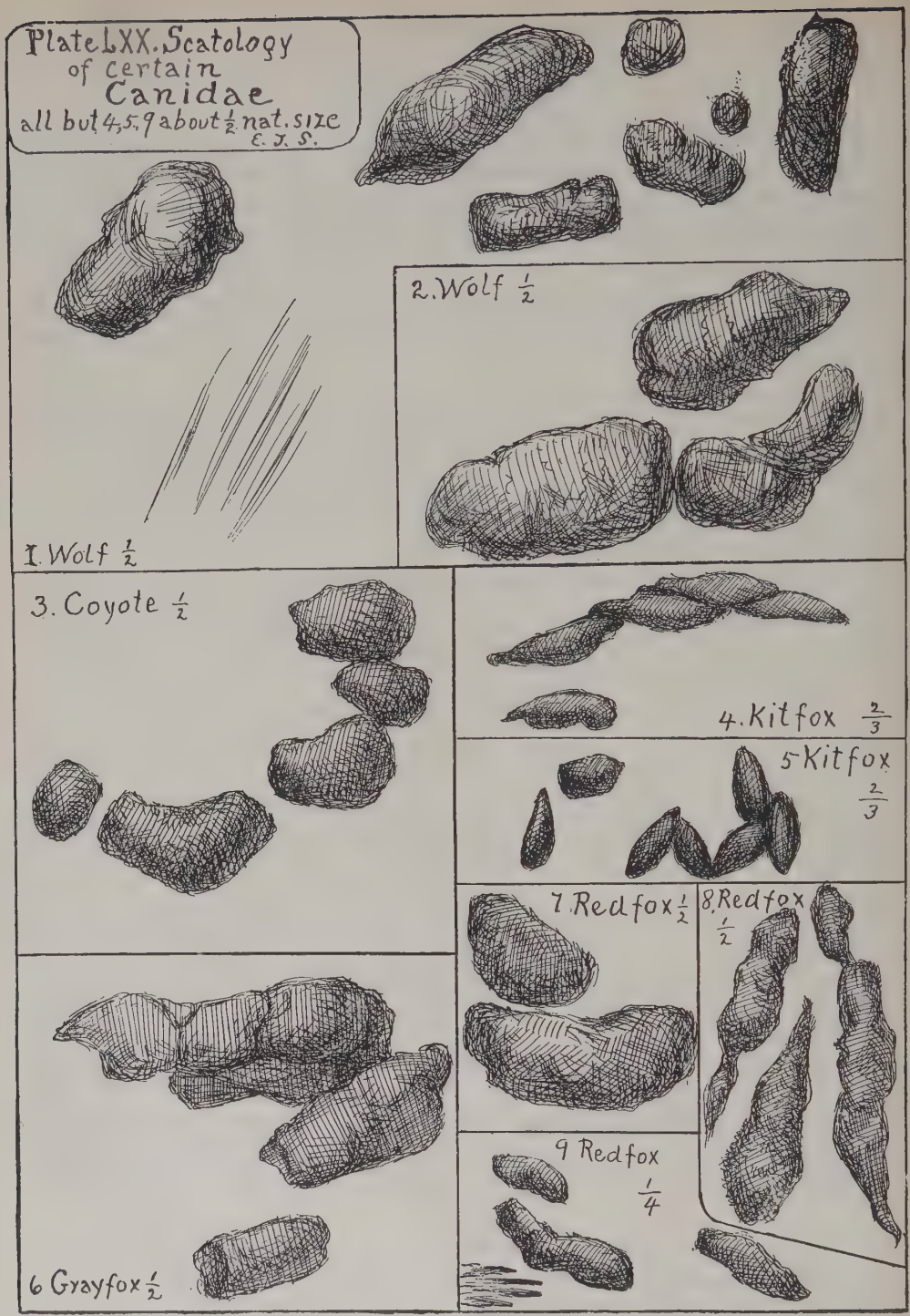
"Bert Higgins, who runs a trap line within the Trinity Game Refuge, reports finding along this one line during one month, the remains of 15 Deer killed by Coyotes. Ranger Bucklew, in April, 1916, saw a full-grown doe, apparently in good condition, pulled down by one Coyote.

"Mr. Wm. Friend writes as follows concerning his experience with Coyotes in the Game Refuge:

"'In regard to the Deer I found killed by Coyotes in the Game Refuge, will say I commenced trapping between Little Creek and Bear Creek on Feb. 1, 1916, and between that date and March 2, 1916, I found the remains of 17 Deer killed by Coyotes.

"'They were all sizes from large bucks to fawns, but mostly small Deer. The snow was about 2 feet deep, and the Deer had collected near the river and in gulches. After the snow settled, the Coyotes could run on top, but the Deer broke through, so it was an easy matter for the Coyote to catch them. In one gulch I came down, I found 8 Deer that had been killed at different times—one of them had been killed recently and none of them were over 10 days. In many other sheltered places I found remains. In one instance, about Feb. 1, T. H. Campbell and I were riding along the road near Philip Habor's place and saw where Coyotes had just killed a spike buck and were enjoying a feast when we frightened them away. I also have a large pair of antlers I brought home from one of their victims. It is not only when the snow is on, but in the spring when the Deer are weak and poor, that they destroy a great many. I was coming home from my traps after the snow had gone, and not half a mile from the Van Matre place I saw 2 Coyotes that had a large buck run down, and would have killed him if I had not happened along at that time. The Deer was not able to get up the bank then.'"

There can be no doubt that the Coyote is blamed for an immense amount of damage really done by Dogs. There were 3 or 4 wild Deer on my Connecticut homeland 10 years ago, but the Dogs got them all. The last



See footnote on opposite page.

seen was in the autumn of 1919, running with 50 yelling, cowardly cur Dogs after it.

As a Hunter of Antelope

The swiftest fourfoot on the Plains was the Antelope. In an open race, the Coyote would have no more chance of capturing it than of catching a Jackrabbit. But he sometimes succeeds by cunning when all his strength and speed might fail, as the following instances show:

John B. Goff, the hunter, tells me that while freighting between Rifle and Rawlins, Colo., some years ago, he saw 2 Coyotes chasing an Antelope. They worked a distance apart, keeping the Antelope running zigzag between them, so that it really did four times the running of either. It was nearly exhausted and ran up to his Horses for protection. The Coyotes then held off.

In an article on "Coyote Partnership," Dr. George Bird Grinnell, referring to the Coyote plan of running an Antelope down by relay chasing, says:

"Of course the Coyotes do not catch every Antelope they start. Sometimes the game runs such a course that it does not pass near any of the waiting Wolves, and only the one that starts it has any running to do. In such a case the pursuit is at once abandoned. Sometimes the Antelope is so stout and strong that it tires out all its pursuers. . . . Two or three years ago I camped one afternoon near Rock Creek, and as there was very little feed, we turned the Horses loose at night to pick among the sage brush and grease wood. Early in the morning before sunrise, while the man with me was getting breakfast, I started out to get the Horses. They were nowhere to be seen, and I climbed to the top of the hill back of camp, from

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PLATE LXX—SCATOLOGY OF CERTAIN CANIDÆ

All but 4, 5, and 9 are about half natural size.

1. Wolf, very large. Banks of Athabaska River, Oct. 19, 1907. Chiefly of Rabbit fur. The scratch mark or signature was very plain.
2. Wolf. Algonquin Park, Ontario, Aug. 18, 1922. A solid mass of Deer hair.
3. Coyote. Philadelphia Zoo, Feb. 7, 1924.
4. Kit-fox. Philadelphia Zoo, Feb. 7, 1924.
5. Kit-fox. Philadelphia Zoo, Feb. 7, 1924.
6. Gray-fox. Philadelphia Zoo, Feb. 7, 1924.
7. Red-fox. Quebec, 40 miles east of Kippewa, Sept. 5, 1905. Composed almost entirely of Mouse fur, with some of Redsquirrel and Chipmunk.
8. Red-fox. Yellowstone Park, July 5, 1897. Chiefly of soft, dark fine fur, probably from Yellow Rockchuck.
9. English Red-fox. Essex, England, Jan. 21, 1906. Noted chiefly on account of the unmistakable claw-mark signature.

which, as it was the only high place anywhere about, I felt sure that I could see the missing animals. Just before I got to the top of the hill, an old doe Antelope suddenly came in view, closely followed by a Coyote. Both of them seemed to be running as hard as they could, and both had their tongues hanging out as if they had come a long way. Suddenly, almost at the heels of the Antelope—much closer to her than the other Wolf—appeared a second Coyote, which now took up the running, while the one that had been chasing her, stopped and sat down and watched. The Antelope ran quite a long distance, always bearing a little to the left, and now seeming to run more slowly than when I first saw her. As she kept running, it was evident that she would either run around the hill on which I stood or come back near it. At first I was so interested in watching her, that I forgot to look at the Wolf that had stopped near me. When I did so he was no longer at the place where he had stopped, but was trotting over a little ridge that ran down from the hill, and watching the chase that was now so far off. He could easily have run across the chord of the arc and headed the Antelope, but he knew too well what she would do to give himself that trouble. After a little, it was evident that the Antelope would come back pretty near to the hill, but on the other side of it from where she had passed before, and the Wolf which I had first seen chasing her trotted out 200 or 300 yards on to the prairie and sat down. The Antelope was now coming back almost directly toward him, and I could see that there were 2 Wolves behind her, one close to her heels and the other a good way back. The first Wolf now seemed quite excited. He no longer sat up but crouched close to the ground, every few moments raising his head very slowly to take a look at the doe, and then lowering it again so that he would be out of sight. Sometimes he crawled on his belly a few feet farther from me, evidently trying to put himself directly in the path of the Antelope, and this he seemed to have succeeded in doing. As she drew near him I could see that she was staggering, she was so tired, and the Wolf behind could at any moment have knocked her down if he had wanted to, but he seemed to be waiting for something. The Wolf that was following him was now running faster and catching up.

"When the Antelope reached the place where the first Wolf was lying hidden, he sprang up, and in a jump or two, caught her neck and threw her down. At the same moment the 2 Wolves from behind came up, and for a moment there was a scuffle in which yellow and white and gray and waving tails were all mixed up, and then the 3 Wolves were seen standing there tearing away at their breakfast."[52]

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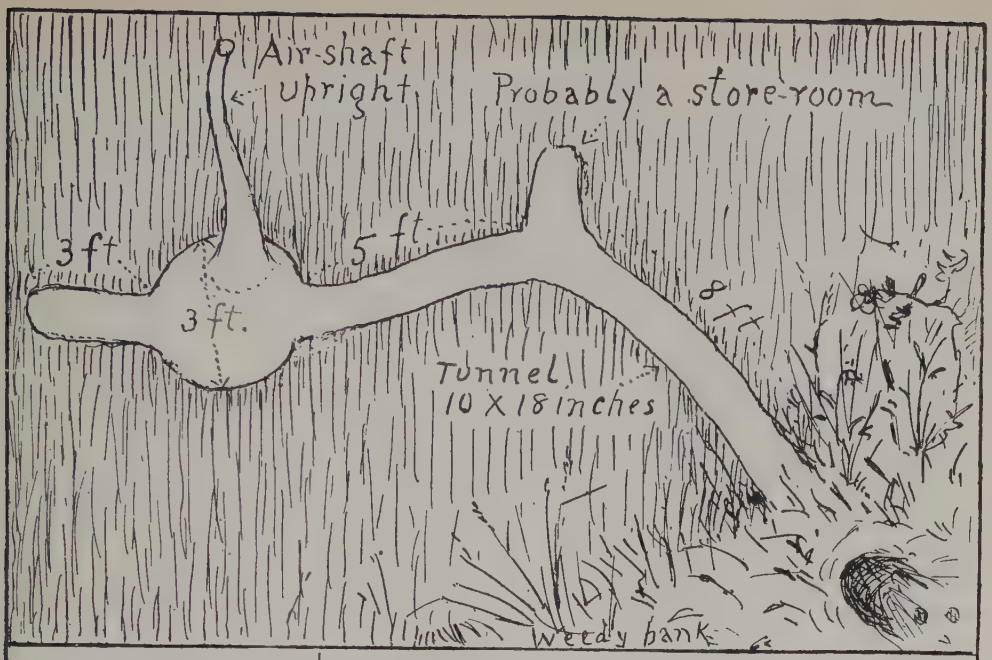
[52] Forest & Stream, Feb. 6, 1897, p. 104.



Plan of Coyote Den opened by A.S. Barton at Boissevain, Manitoba.

Plate LXXI. Coyote tracks (in Phila. Zoo.) showing greater size of outer hind toe marks; there is nothing corresponding in the toes themselves.

His Storage Habit

Like many others of the family, the Coyote has the frugal habit of storing food for future use; whether it can thus effectually hide it from plunderers, or whether indeed it always remembers the spot afterward, I cannot determine, though I think it unlikely that an animal with its high mentality, its sense of locality, and fine nose, could fail of going to the spot at will.

The following incident witnessed by A. S. Barton, of Boissevain, Man., is a good illustration of the storage habit:

"I was mowing hay in my coulee when I noticed, some distance away, a Coyote carrying something in his mouth. He trotted down the hill and with some difficulty through the long grass, but presently stopped and began to bury his booty in a mole-heap, covering it with his nose, as a Dog does. On my approach he decamped and watched my proceedings from the nearest hill, and, curious to know what he had been burying, I unearthed his cache, and found, to my surprise, a fine turkey gobbler, still warm and uninjured, except that its neck was broken. I had no time and less inclination to advertise for an owner, but accepted 'the goods the gods gave' and carried my prize home. Our next Sunday dinner was much appreciated, and we cheerfully drank the health of the purveyor, and of my unknown neighbour also."

His Speed

The speed of the Coyote is great, and has often been the subject of admiring comment, but I think it has been overrated. After collecting data of various kinds, such as actual known records of Dogs and Horses, also the comparative records of Dogs and Hares, or Horses and Foxes, Wolves and hounds, hounds and automobiles, I have attempted a scale of comparative speeds. This appears in a different form in the "Antelope Life", Vol. III.

Blood Race-horse	covers a mile in about					1	"	40	sec. or at the rate of						34	miles per hour	
Pronghorned Antelope	"	"	"	"	"	1	"	50	"	"	"	"	"	"	32	"	"	"
First-class Greyhound	"	"	"	"	"	2	"	0	"	"	"	"	"	"	30	"	"	"
Texan Jackrabbit	"	"	"	"	"	2	"	10	"	"	"	"	"	"	28	"	"	"
Red-fox	"	"	"	"	"	2	"	20	"	"	"	"	"	"	26	"	"	"
Northern Coyote	"	"	"	"	"	2	"	30	"	"	"	"	"	"	24	"	"	"
Foxhound	"	"	"	"	"	2	"	40	"	"	"	"	"	"	22	"	"	"
Gray-wolf	"	"	"	"	"	3	"	0	"	"	"	"	"	"	20	"	"	"

Many hunters would set the Kit-fox or Swift also above the Greyhound, especially for a short race, but I have had no personal experience with the

species in a chase. The little Prairie Cottontail can, I believe, get away from the Swift in a hundred-yard dash; he cannot keep it up for long, but his "muzzle" velocity is incredible and baffles the eye—not a leg, not a Rabbit is to be seen, nothing but a white streak across the prairie, till he promptly disappears in some burrow.

What actually counts in the race is, as usual, the *trifle more* speed that each animal can command.

For example, the Gray-wolf makes 650 yards to the minute and the Coyote about 700, but that 50 yards makes all the difference between living and dying. That 50 yards margin is probably the foothold on which the whole Coyote race has been built up.

These rates, it will be seen, trench on the proper realm of birds: small birds make only from 25 to 30 miles an hour.

It is a well-known principle that the special development of an animal is its most variable part. Thus the peculiar bell in the throat of a Moose varies enormously; the bill of the long-billed curlew, the neck-feathers of the ruff, the spots of the Ocelot, the white bands of the Skunk, the horns of the Elk, are so varied that rarely two are found just alike. Speed is one of the peculiarities of the Coyote as it is of the greyhound, and we must, therefore, look for great variations of rate. I have selected an average for my calculation, but there are occasional individuals, Coyotes of rare gifts, whose speed and endurance would put them very near the top of our scale.

An individual of this description lived for 3 years on the north slope of Turtle Mountain, near Boissevain, Man. He was known as the "Greyhound Coyote." A. S. Barton hunted him many times with first-class greyhounds, Dogs which ordinarily had no difficulty in catching a Coyote, and, though the chase was several times over open prairies, he always left the Dogs behind in a straight 3-mile run, and safely reached his retreat in the wooded ravines of Turtle Mountain, thanks, not to any stratagem, but to his speed. It is not known what his end was; he may, indeed, be living yet. I hope so.

The Coyote a Good Citizen

The Biological Survey has gathered a mass of evidence for and against the Coyote, founded chiefly on its food habits. This is presented by Prof. D. E. Lantz in a bulletin from which I quote:

"*Beneficial Habits.* Among the mammals included in the food of the Coyote are many injurious species; and, so far as their food is confined to these, the animals are decidedly beneficial to the farming interests of the country. The destruction of Rabbits, both large and small species, is of great advantage, especially on the plains and in the cultivated valleys, where their depredations are keenly felt by the settlers. The various species of Jackrabbit have often been observed as included in the Coyotes' fare, and the smaller Rabbits are also habitually eaten. The Coyotes usually catch the Rabbits by lying in wait behind the bushes and bunches of grass near their paths, and pouncing upon them as they pass. . . . The constant warfare of many Coyotes upon these rodents has much to do in keeping down their numbers; and the abundance of Rabbits in some sections of the West has been largely attributed to a local decrease in the number of Coyotes, caused by an unusual activity against them which had been stimulated by high bounties.

"Prairie-dogs (*Cynomys ludovicianus* and other species) are also a staple Coyote food. . . .

"Besides Rabbits and Prairie-dogs, the food of the Coyote is known to include the following mammals:

"Rice Rats (*Oryzomys*), Kangaroo Rats (*Dipodomys* and *Perodipus*), Wood Rats (*Neotoma*), Ground-squirrels (*Ammospermophilus*, *Callospermophilus*, and *Spermophilus*), Woodchucks (*Marmota*), Voles, (*Microtus*), Pocket Gophers (*Thomomys*), Chipmunks (*Eutamias*), and Pocket-mice (*Perognathus*). All of these are more or less harmful, and the Coyote performs an important service in preying upon them. The service is not an occasional or a spasmodic one, but lasts throughout the year and throughout the life of the Coyote. When the number of animals taking part in the work is considered, the enormous importance of its bearing in maintaining the 'balance of nature' becomes apparent.

"The Coyote is useful also as a scavenger. In the prairie country, especially in winter, it comes into towns at night searching for garbage thrown into the alleys. Here it finds remnants of meat from the table, offal

PLATE LXXIII.—COYOTE FAMILY—NINE PUFS—THIRTEEN MILES FROM DENVER
From a photograph by W. R. McFadden

from game, and similar prizes. When hungry it will reject no animal food, not even carrion. The slaughterhouses near the towns are favourite feeding places, and the animals are often shot there by moonlight. On the ranges, they soon consume dead Horses and Cattle, leaving the bones clean."[53]

In the Southern States, in India and other countries, buzzards and vultures are protected because they clean up all carrion and save the country from many a possible pestilence bred of such decay. For precisely the same reason we owe the Coyote a debt of gratitude.

A remarkable article by W. B. Lawrence, of Millbrae, Cal., appears in the *California Fish & Game*, Oct., 1922, pp. 230–31. This is a summary of it: On 10¼ square miles of the Spring Valley Water Company land near San Francisco, trappers caught in one season 84 fur-bearers, including 17 Coyotes, 4 Coons, 18 Skunks, 8 Wild-cats, 15 Opossums, besides sundry Civet-cats, Foxes, Weasels, and common Cats run wild.

He finishes with this significant paragraph: "Quail have decreased in number, so doubtless predatory animal control is but one factor in the problem, and there are doubtless others of importance that would be revealed by a more intensive study."

The Charges Against the Coyote

In the Lantz paper already quoted, the only count that he makes against the Coyote is this: "In Aug., 1903, a member of the Biological Survey met a Coyote carrying a Weasel in the Pecos River Mountains of New Mexico at an altitude of 11,600 feet. The Coyote, frightened, dropped its prey and ran off."[54]

Note the assumption that the Weasel is a beneficent animal and that therefore the Coyote was in mischief.

In the chapter on its food, the destruction of some Sheep is admitted, though it is *not one tenth of that done by Dogs*. The answer is that Sheep in small fields properly fenced are not in danger, and Sheep on the open range or in the National Forests without any restriction have proved a devastating plague.

The killing of occasional calves is admitted—but only on the open range, and open range is nearly a thing of the past. In fenced fields, one female Elk will protect any number of calves from Coyotes or Dogs.

The killing of Deer is admitted—but it is confined to northern California and much of the heavy-timber country where there is a combination of many Deer and all-winter snow.

[53] Coyotes, pp. 12–13.

[54] As above, p. 14.

The killing of Antelope is admitted—but the Antelope are gone now—alas, we fear, gone for ever!

The killing of chickens is admitted—but not when they are properly fenced or housed at night.

These are the summings-up of four judges who have elected themselves to the Supreme Court and sat on the case:

Frank C. Pellett, of Iowa, says: "Coyotes unquestionably do much good in ridding the country of Fieldmice, Rabbits, Spermophiles, Gophers, etc. So while they become a serious menace to the range stockman, it is a question in my mind whether it would be desirable, even though possible, to exterminate them in farming regions like this."[55]

Joseph Dixon, of the University of California, says: "The Coyote would be a detriment in a poultry-raising section, but . . . if we kill off all the Coyotes, we must face the problem of ourselves accounting for the thousands of Ground-squirrels which these animals now annually destroy. In certain instances, Coyotes have actually been afforded protection by ranchers on the ground that they were proving beneficial through the catching of Gophers and other rodents when flooded out during the irrigation of alfalfa fields. *A Coyote is not necessarily a bad citizen.*"[56] "The economic status of the Coyote may therefore be a question of locality, as well as season."[57]

Dr. A. K. Fisher, after full investigation, says: "In parts of the West where fruit growing and farming are dominant industries, it may be wise to encourage Coyotes and Bobcats within certain limits, provided poultry and Sheep are properly protected at night. Numerous ranchman and fruit growers have learned by experience that these animals, if unmolested, will free their premises from Rabbits and other crop or tree destroyers. Where Coyotes and Bobcats have been allowed to do their work thoroughly, they are fully appreciated, and *many ranchers would almost as soon shoot their own Dogs and Cats as* [*these*] *their wild benefactors.*"[58]

Listen to the careful statement of A. W. Anthony, Curator of the San Diego Museum, one of the most experienced naturalists of the West. While disclaiming any special friendship for the creature, he writes in cold logic, "A Defense of the Coyote," which I condense as follows:

"In eastern Oregon, where the Coyote has been hunted by Federal officials for the past several years, the Jackrabbit has grown so abundant

[55] Forest & Stream, Mar. 25, 1911, p. 450.

[56] Control, pp. 382–1.

[57] As above, p. 382.

[58] Yearbook, Dept. Agri., 1908, pp. 188–89. Italics mine. E. T. S.

that since 1911 it has taken at least 10 per cent. of all the crops suited to its food habits. . . .

"In 1911, I began to take the matter up with the Federal authorities, and was told that an epidemic would soon give us all the relief we could ask for. There were two slight 'waves,' when the Rabbits were somewhat reduced in numbers, but they were back to normal within a year each time. Ground-squirrels were nearly as numerous as the Rabbits, but did not destroy as much because of the fact that they do not work all year.

"As for the damage done by the Coyote, I believe that it is not nearly as great as is claimed, and this seems also to be the opinion of some stockmen. . . . I have several times found, in cases where heavy losses were being claimed, that the Sheep were bedded down in an exposed situation, with the herders and the Dogs sleeping a mile or more away from their charges. This gave the Coyote ample opportunity to help himself. . . . I am convinced that the best check [on Rabbits] is the Coyote, which nature has placed there to keep down just such pests. . . . I have no doubt that *the Coyote is the rancher's best friend*[59] and that many of them so regard it."[60] This conclusion, however, is not accepted by the Biological Survey.

Now for the most sordid consideration of all: The Coyote is a valuable fur-bearer. Its pelt brings from $5 to $20 according to quality. The average price paid in Canada, season 1921–22, was $9.07 per skin. The total value of the Canadian catch was $277,338. In the season 1919–20, the average price was $17.35 per pelt.

Here rests the Government's case for and against the Coyote, for governments are paid to be sordid.

There is yet another consideration—the wonderful value of this noble little brute to sportsmen. It is the giver of more pleasure now to sportsmen, horsemen, and dogmen than any other creature I know of in America.

Lastly, there is the sentimental value—the joy that the naturalist gets in seeing a beautiful, splendid wild thing—a joy that I shall say no more about at present. Yet I must ask: "Do you, with these facts before you, wish to have the Sheep-men carry out their avowed purpose of exterminating the brave and beneficent Coyote?"

His Troubles

The winter, is, of course, the chief enemy of the Northern Coyote. The shutting off of many food supplies, the severe weather, the exposure to view

[59] Italics mine, E. T. S.

[60] Cal. F. &. G., July, 1923, pp. 111–12.

of the hunters, poisoned baits which in summer would be scorned but which are now swallowed in desperation, all unite to make havoc in the numbers, and those that are left by the end of February are the strongest and wariest.

Next after winter, the worst enemy of the Coyote is man; next to this, Dogs; next, disease and parasites; then probably the Gray-wolf, the eagle, and the horned owl.

It is improbable that these birds would attack a grown Coyote, or that the Gray-wolf could catch one, but the very young would fall an easy prey.

The Elk and Deer are to be reckoned in this list. They have a well-founded hatred of all Wolves, and never fail to strike one when they can. One blow from the foot of an Elk or Deer may disable a Coyote and give the hoofed avenger a chance to finish his work.

In the trial for his life, it has been allowed by the courts to be a point in his favour that the Coyote is a scavenger and cleans up the country by devouring all carrion.

There are, however, several disadvantages in this food supply. It affords a certain place for traps and poison to be laid; hundreds of Coyotes and not a few Dogs are thus destroyed every year.

Mange. Epidemics of mange have been known among the Coyotes. This malady speedily ruins an animal's coat, which in a Northern winter, of course, means death.

A farmer, Thomas Kerr of Carberry, Man., told me that one winter a Prairie-wolf without any hair on it hid itself under his straw stack, and although driven away by his Dog, it returned and ensconced itself under the granary, where he shot it. It had some disease which had robbed it entirely of its hair, excepting a little patch on the shoulders; it was trembling with the cold, and could not possibly have lived through the winter.

Major Allan Brooks says of the Coyotes that have spread through southern British Columbia, that about 1900 their numbers were greatly reduced "by an epidemic of mange. Many of them were practically denuded of hair, and when such were caught in a trap in anything like cold weather, they would be frozen to death in one night. I have caught them and found them dead in No. 1 traps, staked down solidly for smaller animals, when in this condition; which plainly showed how weak they had become. When in full vigour, I have known a Coyote to break the chain of a Newhouse No. 4.

"Just now the mange seems to be entirely eradicated, but Coyotes are not increasing in numbers, probably owing to the increased Provincial bounty."[61]

[61] Forest & Stream, Nov. 21, 1908, pp. 812–13.

Deafness. Those of us who have lived in and long faced the bristling array of spines, spears, pricks, stings, burrs, sharp seeds, yucca jags, climbing spurs, cat claws, nails, spikes, thorns, and devil hooks with which most of the plant life in the great Southwest is so superabundantly garnished, will feel a due and brotherly sympathy with the sufferers whose case is thus discussed by Prof. Loye Holmes Miller of the State Normal School of California.

"In the semi-arid regions of the West," he says, "the struggle for existence is so strenuous that the special senses are very highly perfected. Especially is this true of the sense of hearing, as evidenced by the enlarged external ear in many forms. The Coyote (*Canis ochropus*) is especially marked with this enlarged concha and undoubtedly has, under normal conditions, a very keen sense of hearing. Popular report endows him also with almost supernatural sense of smell. The individual of the species must then labour under a decided handicap if the hearing be destroyed or the sense of smell even slightly impaired. The instance which I cite suggests that such may be often the case.

"In cleaning a pair of skulls of this species, which I obtained in August last, I found in the case of the male that both ears were crowded full of the bearded seeds of the common fox-tail grass (*Hordeum murinum*) which is such a pestiferous weed in the Southwest. The seeds were packed closely into the tympanic chamber and the beards were very much darkened by having remained in the ear some time subjected to the exudations from the inflamed surfaces. In the same individual, a fully bearded seed was found in the left nostril worked well up among the folds of the turbinated bone.

"The second specimen, a female, taken at the same time, had the grass in both ears, but none in the nostrils.

"The ear bones showed no signs of necrosis, though the seeds were in direct contact with them. Hearing was undoubtedly destroyed, and in the case of the male, the sense of smell must have been impaired.

"The animals were taken by strychnine poison with a bait of watermelon, a crop the Coyote injures extensively in the sparsely settled regions. The specimens came to my hands in the meat; they were in good flesh and pelage. There was no possibility of the seeds having gotten into the ears and nose after death.[62]

Accidents. All creatures that run swiftly in woods or brush are subject to the accident of "snagging," or impaling, in varying degrees. The following "Woodland Tragedy" is an extreme case: The story was told by J. W. Hulse, of Crevasse, Mont.

[62] Science, Jan. 11, 1907, p. 67.

"While returning from a tramp," he says, "I saw near our cabin, on one of the open mountain slopes, a dead Coyote. Much poison was used this side of Yellowstone Park last winter, and my first thought was that the animal had fallen a victim to it. On reaching the body, my surprise was great to find it had impaled itself on the point of a stick which pierced the heart. The Coyote must have been running down hill, probably chasing a Rabbit, when it struck the stick with great force. The point entered the body in front of and under the right shoulder and penetrated $6\frac{1}{2}$ inches before being stopped by the stump of a lateral branch. The stick was 2 feet long, and about 2 inches in diameter at the larger end. It was freshly broken, and the wood had absorbed blood for about an inch from the body; otherwise there was no sign of blood. The Coyote had been dead long enough to spoil the skin, or I would have had it mounted."[63]

Rabies. The Jackal of the Old World is commonly reported to be peculiarly subject to rabies or hydrophobia. The Coyote is the American Jackal, a Jackal on a bigger, more dignified scale, but still of that ilk, and by chance also subject to epidemics of rabies.

According to Prof. J. Shelley Laurman, Director of the state Bacteriological Laboratory, Harney County, Ore., there was an outbreak of rabies in Harney, Crook, and Malheur counties in 1915.

Next year the epidemic had spread to northern California. Energetic efforts were made to stamp it out. The following report is quoted in *California Fish & Game* for July, 1917, pp. 120–21:

"The recent campaign for the extermination of rabid Coyotes in Modoc and Lassen counties waged during 1916 by the Forest Service, the California State Board of Health, the Federal Health Service, and the Biological Survey, resulted in the destruction of 2,707 Coyotes and 178 Wild-cats. In addition, county records show that during the same period, bounties were paid on 1,474 Coyote scalps. Figures compiled by the State Board of Health indicate that 362 head of Cattle, 39 head of Horses, 233 Sheep, and 18 Swine died from rabies during this period. Hundreds of head of stock found dead are also supposed to have died from rabies, but proof was not positive. Laboratory examination of the brains of 127 domestic and wild animals gave positive tests of this disease." [64]

The blind fury of a mad Coyote is illustrated in the *Yearbook*, U. S. Dept. Agri., 1920, p. 294, which shows the head of a Coyote with the mouth crammed and bristling full of Porcupine quills—an attack that apparently ended the Coyote's life.

[63] Recreation, March, 1899, p. 220.

[64] Weekly Bulletin of Forest Service, Feb. 24, 1917.

The following illustrative and lurid adventure with a mad Coyote was recorded by Malcolm Little, of Provo, Utah, and sent me by Mrs. S. Young Gates of the same city:

"The summers of 1891 and 1892 were extremely dry and hot in northern Mexico. A two-years' drought had left the extensive valleys barren. The grass was crisp and bleached, the dust heavy and rose in clouds, and the Casas Grande River was dry save for a few deep, stagnant pools. This being the only water within many miles, all the animals of the immediate vicinity came there to drink. As a result, on each side of the river, for a great distance, hardly a spear of grass could be found.

"The Coyotes were very numerous. They seemed to have been drawn from all the surrounding country to these watering places. So numerous were they, in fact, that in a few hours a man sitting in a tree near one of the pools shot 13 that came to drink. They roamed about in droves of from 8 to 12 in search of food. They were gaunt and hungry-eyed, and their fur was long and shaggy. They appeared to have lost nearly all the sense of fear of man, for they would hardly move out of the way of a horseman. They came into the towns and several were killed in the yards of the dwellings. One, I remember hearing of, walked into the parlour at the front door, and while yet inside was killed with a garden hoe by the lady of the house. These many little encounters, however, were considered as only matters of pleasant gossip, and no one thought of any possible danger coming from them.

"In late June of 1892, 3 men camped for the night midway between the village of Ascension and the Boca Grande, near one of the watering places on the river. They were on the range in search of Cattle, and, as is common with cowboys, after the Horses were hobbled out and supper over, they spread their blankets on the ground. A wide bed was made, and about 9 o'clock they lay down to sleep, Derby Johnson occupying one side and the Jacobson brothers the other two places.

"One of the Jacobsons was anxious about the Horses and did not sleep soundly. In a few hours he was startled from a state of semi-wakefulness by a muffled sound, and seeing Derby sitting up in bed, and thinking something might be wrong with the animals, began to sit up also. As he did so, he saw what appeared to be the tail of a Coyote moving to and fro. He sprang to his feet. The animal with its teeth fastened on the right jaw of his friend, just to the right of the chin, was clinging with the tenacity of madness; while Derby, apparently frozen by awful sensations, sat clasping the Coyote by the neck with both hands, one on each side. It was clear the only way the animal could be removed was by prying open its mouth. The brothers were strong men. Unconscious of the danger to themselves, or

disregarding it, they took hold of the fastened jaws and broke them apart, the lower one being entirely wrenched from its place. They threw the Coyote to one side, but, with its lower jaw dangling downward and with menacing growls, it came towards them again. The young man, Derby, now freed, took his knife from his pocket, cut the animal's throat, and then fainted.

"One of the brothers remained with him while the other went for the Horses. About 11 o'clock that night, they started towards home, a distance of 15 miles. Derby could ride only a few hundred yards without having to stop to rest, and very frequently the journey was stopped by his fainting.

"They reached home early in the morning. Examination showed the Coyote had left a bad wound under his chin, where the teeth had penetrated, while in the upper part were only holes of the canines.

"In a few days the patient was around, apparently well and doing his work.

"After the biting the Coyote was examined, and only dry cottonwood leaves were found in its stomach. From all appearances it had had the rabies.

"About a month after the occurrence, the young man was riding with his companions, gathering Cattle from out of a lake. The water was shallow, hardly knee-deep to the Horses, and the Cattle had gone there to feed on the rushes. All day this work continued, and while splashing through the lake he felt the first symptom of hydrophobia—a strong aversion for water. This feeling later was aggravated by some of his friends offering him their canteens from which to drink.

"He returned home immediately, and for a while was delirious. These spells continued intermittently. He grew worse for two or three days, constantly developing a still stronger dislike for all liquids, and he was able to swallow but very little. Toward the last his ravings became maniacal, and several men were required to hold him. A viscid secretion came from his mouth, the colour of his skin became purple, and his ravings were very loud —the latter, however, had nothing like barking about them, contrary to the common belief in cases of hydrophobia. During the last hour of his life he was quiet, and he died peacefully.

"After this happening, a 'scalp hunt' was gotten up, and 109 Coyotes were killed."

I have never heard of a sane Coyote attacking man.

Carrion-craze

In the Wolf chapter is a discussion of the doping habit or carrion-craze of the species. The same remarks apply to the Coyote.

Charles Greenwood, of Railroad Creek Lake, Chelan, Wash., writes: "The Coyote rolls in carrion and apparently enjoys the sensation. I have seen one in the act of doing so. He was doping in the entrails of a dead Horse. This Coyote had been feeding on the carcass, but selected the meat on the under side of the loin for its meal, and then rolled its head, neck, shoulders, and breast in the offal, exactly as a Dog will disport itself on the grass after having a bath. What its object was I never could guess, but always supposed the odour was pleasing to the Coyote."[65]

How to Destroy Him

Coyote-hunting in an automobile is a sport that has been much followed of late in the few parts of the West where still there are wide open spaces.

In view of the fact that the car can go 40 miles an hour indefinitely, and the Coyote only 24 and for a short run, and the Coyote has no defence or means of attack to meet the onset of high-power rifles, the element of fair competition is wholly lacking; that is, it cannot be called "sport." As destruction, it would be more complete if the slaughterer would use aeroplanes for scouting and poisonous gas to "get" the creatures in rough places or any effective hiding.

During my early days in the West, I trapped and poisoned many Coyotes. I studied them so carefully and became so expert that I could get Coyotes with certainty by sundry tricks which played on the creatures' strongest instincts and deep-rooted habits. I have not forgotten those tricks; and Coyote nature has not changed, so that I could go out to-day and gather up Coyotes if I would. But I do not propose to do so, and I intend that my unhallowed information shall die unrecorded. How to destroy him you shall never learn from me!

The Indian Way of Hunting

It is a real pleasure to enter here the story, "Hunting Coyotes in Death Valley," because it gives us a maximum of huntercraft with a minimum of destruction. It is from the pen of Harry H. Dunn, of Los Angeles, and appeared in *Forest & Stream*, Aug. 3, 1907, p. 172.

He was in camp on the famous California Desert with his halfbreed Indian guide, Bob Lee. The Indian offered to show him some Coyote hunting that night. Away they went in the close of an autumn day; and this is how he tells it:

"In the mesquite thickets of the dried-out beds of desert streams, in occasional caves in the lava buttes which form the mountains of the Cali-

[65] Recreation, Sept., 1897, p. 233.

fornia Desert, and in the willow copses marking the course of every live creak, the Coyotes have their homes and bring forth their young. Rabbits, quail, Rats, Chipmunks, and even the big lizards (chukawallahs) furnish them with an abundant supply of food, and the causes of their increase to the great numbers which now infest the desert are not far to seek.

. . . . . .

"About 5 o'clock, the best and coolest part of the desert day in the late fall, I got out the little carbine and went out to wake the halfbreed. He brought from the rear end of my wagon bow and arrows which he had gotten for me from one of the tribesmen up around Resting Springs. These were Indian weapons, not the painted gauds which are sold for the real thing in the curio stores of the Coast and the East.

"'No use the rifle,' he said. 'Scare 'em all away with one shot.'

"'How far?' I asked.

"'An hour's walk; maybe more,' he answered. And these were practically the only words spoken during the hour's walk.

"This way led first over the rolling sand, then into the sandhills, where of necessity we walked slower. Almost as soon as we passed, the sand fell into our tracks, the slight breeze filling them so rapidly that in 5 minutes our trail was completely obliterated Then we plunged into the hills. . . .

"No water was visible, but Bob said there were pockets in the hill and one considerable tank farther up the canyon to which Coyotes, Foxes, and Wild-cats came to drink. Back from a mesquite clump we lay down in the centre of a circle of stones marking the place where a tepee once stood.

"These rocks were small, and we gathered enough of them, after we had rested and smoked a few minutes, to build up a respectable blind, and in my mind I thanked the aborigine who had carried them from the slope of the near-by hill for his skin home in the long ago.

. . . . . .

"We built the wall high enough so that we could sit or lie comfortably behind it, and carried a few armfuls of brush from the creek bed to scatter around it. By the time we had finished, darkness had begun to gather. Far off across the valley a Coyote howled. In an instant there came, seemingly from the ground at my side, an answering howl. Again the Coyote barked, and the decoy at my side answered him, and when the cry came back out of the shadows, it seemed a bit nearer. Bob turned over on his side and barked twice, short and sharp, unlike the call he had first made. Then, almost before the sounds had left his lips, he lifted up his voice in the long howl which is the family mark of the Coyote tribe throughout the West.

"This time the call from the hills was nearer, and after two more cries, a shadow slipped across a little moonlit patch. Again the halfbreed called and then lay still, the last echoes of his voice dying in his throat, leaving the impression, even to me, who was near by, that he was at a great distance. Evidently the Coyote was deceived. He stood in the plain light, scarcely 2 rods from the blind. Closer he came, passing us by on one side, evidently suspecting nothing from the pile of stones.

"I started to raise the rifle, but Bob laid his hand on my arm. I saw his left arm straighten out, saw the white of the bow in the moonlight, heard the soft swoosh as the string was released, and then the Wolf leaped into the air and fell back dead."

Strange Incidents

Hybrids. This species readily crosses with the Dog. S. L. Bedson showed me a number of these hybrids at Stony Mountain, Man., in 1885. They were intermediate in character and continued to be inter-fertile with either stock, at least for two or more generations. They were bred in his menagerie and carefully observed.

I never, however, heard of a cross between a Coyote and Gray-wolf, although the Dog is as readily crossed with the latter as with the former relative.

Another hybrid was reported to me by A. G. Dunnet, of Virden, Man. On Aug. 6, 1912, he wrote me as follows: "I have in my possession a female hybrid sired by a mongrel Dog and out of a bitch Prairie-wolf. It is black in colour with only a little white on its breast. It shows practically no trace of the Dog, but is in appearance very much like a black Fox. I got it a puppy, and have had it over one year now. . . .

"The animal which I have is an authentic specimen. I saw it as a puppy when it was suckling the mother, a Prairie-wolf, and I can furnish complete details re its parentage."

A much more picturesque and puzzling case comes recently from Westchester County, N. Y., under the caption: "Wolf, Fox, or Dog?"

"During the spring of 1919, Mr. Edward G. Faile, of Rosedale, Westchester County, N. Y., began losing his poultry in such an alarming quantity that immediate action became imperative. The thief was at first thought to be a Fox, as the roosts were only visited at night, and it was impossible to get a good look at the varmint who successfully avoided all traps set for his capture. Later it was decided that it could not be a Fox, as chickens were taken from roosts too high for the largest Fox.

"Several times the animal, or animals (as there were 2 of them working

together) were sighted by Mr. Faile and members of his family, but due to the poor light, the Fox theory again gained favour, as the animals had the appearance of Foxes except for their size. One evening, just at dusk, Mr. Faile was lucky enough to secure a fair shot as one of the animals was approaching the henhouse. It was apparent that the rifle ball had found its mark, but when the farm Dogs closed in on the chicken thief, they were badly cut up, and the animal would probably have escaped had it not been for a timely charge from a shotgun which ended the argument.

"The hide was sent to a prominent New York taxidermist who reported to Mr. Faile that he could not identify it. The writer, when told of the incident, made a trip to Mr. Faile's home, feeling confident that he would find the common Western Coyote. Instead, he found the skin of an animal different from anything he had ever seen before. The brush, size, and head were Coyote. The body colour was that of the common Red-fox. The ears were too short for a Coyote, and the fur was much too fine in texture.

"Realizing that a hybrid had been taken, the skin and skull were brought to New York City and authorities consulted in an effort to find out exactly its origin. When the skin was first shown to Dr. Roy Chapman Andrews and Dr. Harold E. Anthony, Associate Curators of Mammals, American Museum of Natural History, they decided that the animal was a Coyote with a distinct Dog cross However, examination of the skull and comparison with the skulls of Dogs and Coyotes made them modify their opinion, and the final decision was that this animal was a second or third Dog-Coyote cross. The only Coyote characteristic found in the skull was the length of the nasal region. The skull was too broad, and the brain cavity, while not swollen to the extent found in the domestic Dog, was too large for that of a Coyote. The Prairie-wolf has no depression or stop in front of the eyes as is found in all Dogs, and in this respect the skull again showed the Dog characteristics.

"Doctor Andrews offered the following as a possible solution of the taking of this animal in a section where Coyotes have not before been found in the wild. Possibly someone had a Dog-Coyote in captivity which crossed with a collie, common shepherd, or possibly a police Dog. The pups may have all failed to show any of the Wolf characteristics, as is often true of the first cross. However, on the second or third cross the throwback to the original strain became very pronounced, with the result that this animal was almost a true Coyote type in appearance and had the characteristics of the Wolf."[66]

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[66]Field & Stream, Aug., 1920, p. 401.

Some Remarkable Coyotes

In 1904, A. S. Barton related to me a curious instance of a crippled Coyote that had lived for the previous 2 years near Boissevain, Man. It was known as the "Three-legged Terror." One of its front legs was missing (probably it was lost in a trap), but in spite of this, the creature could outrun an ordinary Dog. Greyhounds or very fast Dogs easily outstripped it, whereupon it found a place to protect its rear and presented such a desperate front that it had hitherto escaped.

I suspect that this was a female, which might partly have accounted for its immunity.

Another case of the kind was recorded by Enos A. Mills. "Near Canyon City, Colo.," he says, "an apple-grower showed me a 3-legged Coyote that used his orchard. The Coyote had been about for 4 or 5 years and was quite tame. He was fed on scraps and was wise enough to stay in the small zone of safety round the house."[67]

Some sad accident it was no doubt that robbed these wild freebooters of the leg. We have no way of learning what it was because they escaped.

A Strange Friendship

In the Badger chapter will be found several cases of pleasant friendships between Coyotes and Badgers. There have been many in which the Coyote made a brotherly alliance with a Dog. But the only one that I know recording a Cougar and Coyote combination is the following from Enos A. Mills's book:

"On one occasion, when I was on a cliff at the edge of a grassy opening, I was astonished to see a Coyote trot leisurely across, and just before he disappeared in the woods a Lion appear on the opposite side of the opening, following contentedly along the trail of the Coyote. The next day I again saw this friendly pair, but on this occasion the Lion was leading and the Coyote following. Afterward I saw their tracks a number of times.

"Just why they were associated in this friendly manner we can only conjecture. It will be readily seen that the Coyote, which has all the wisdom of a Fox, might follow a game-hog Lion about, and thus, with little effort, get a substantial and satisfactory food supply. But why the Lion should willingly associate with a Coyote is not quite clear. Perhaps this association proved to be of some advantage to the Lion in his killing, or it may have been just one of those peculiar, unaccounted-for attachments occasionally seen between animals."[68]

[67] Watched, p. 95.

[68] As above, pp. 203–04.

The Wise Little Wolf

The Prairie-wolf is mentally a compound of Fox and Wolf. While gifted with a good deal of cunning that is shown in its avoidance of traps and its method of taking its prey, it is also a desperate fighter when at all evenly matched.

I have more than once seen a Coyote run across an open stretch of black ploughed land, then on a piece of dry yellow grass sink into concealment. It matched it perfectly in colour, but was probably actuated by the idea that it was cover.

The Coyote is less shy and cunning than the Gray-wolf. I find the following characteristic note in my New Mexico Journal:

"Clayton, Dec. 14, 1893. This morning I found that a small Gray-wolf had run my drag till he came to the first trap; there he had turned aside, passing three cheese baits. A second very large G ray-wolf had struck the drag just before the second traps. He had passed them unhurt, then had come to a cheese bait, urinated on it, and had then left the drag altogether. A Coyote that was following him on the chance of pickings, came on the bait and was kept from it by the treatment the Wolf had given it, but went on a mile and a half, picked up a poisoned cheese bait, and then half a mile farther got caught in the next trap, where I found him stark and dead."

That the Wonder Dog is equipped with a sixth sense that tells him when a man is armed, every hunter in the West is fully convinced. The following incident is one of many that could be cited in proof.

One evening of October, 1882, on the Big Plain, Manitoba, my neighbour, G. M. Wright, came over to ask for the loan of a "gun or something." He said that for a week past, a big Coyote had been living on them, eating out of the swill pail, lying asleep on the door mat, playing with the Dog, killing an odd chicken, and sometimes scaring the children by standing up on his hind-legs to look into the window.

When the men were around, he moved off to safe distance from stone's throw, but seemed to think he owned the place, and knew perfectly well that there were no guns at hand.

I went at once with the rifle. It was 9 o'clock at night when I arrived. I was up at dawn and on guard in a window. I saw the Coyote a quarter of a mile away, watching from some scrub, and never after did he come within range.

At the same place on March 18, 1883, I had another experience that shows somewhat the mind of the Prairie-wolf.

About 9 A.M., I was leaving the barnyard with team and sleigh to get a

load of wood. As I rounded the stable, I came into full view of a dead calf that was lying on the open prairie 75 yards away. A Wolf was tearing at the calf; he saw me plainly but went on with his eating. Of course I had no gun; I knew that if I stopped now to get a gun the Wolf would run. So I kept straight on. I passed within 30 yards of him; he watched me but kept on eating. After I was 300 yards away, I turned back by another road, intending to go cautiously to the house and get the gun, but the moment I left the beaten road, that watchful Wolf seemed to divine my purpose and ran as though already the lead were flying after him.

I have had similar experiences a dozen times since, and Grinnell makes an observation in line thus: "These Coyotes are as impudent and unconcerned as possible when you don't happen to have a gun with you. Last autumn I saw them lie down within 30 or 40 steps of me just to wait till I had passed by, and, as I said, at night they come up all around the house."[69]

A parallel incident is narrated by Dr. W. T. Hornaday: "The delicacy of the Coyote's judgment in keeping always beyond fair gun-shots is truly wonderful. If he is not a mind-reader, his actions belie him. Twice in Montana, each time for 2 weeks, have I tried my utmost to shoot a Coyote; but during those periods not one would offer more than a running shot at 300 yards or more. Twice, however - and immediately after the above—when riding quite unarmed, have Coyotes sat down beside the trail, waited for me to approach within 40 yards, then yawned in a bored manner, and slowly trotted off. It is my belief that those animals knew perfectly well my inability to shoot."[70]

This is an incident of a kind that has led many to credit this animal (and others) with the power of telepathy. Before accepting such an explanation we must have many cognate instances recorded by trained observers, and also have a fuller knowledge of the animal's sense-capacity in an ordinary way.

Dr. G. B. Grinnell writes:

"The wisdom of the Coyote is proverbial. An example of this happened not long ago on the ranch. We have a yellow sheep Dog, named Shep, who very much delights in chasing Coyotes, Jackrabbits, or Antelope. He never catches any of these creatures, but he always chases them, and after he has run himself down, comes back with lolling tongue and mortified air. The Coyotes often come up within 150 or 200 yards of the house during the day, and whenever the Dog sees them he chases them out of sight. If they do not take the trouble to run fast for him, he overtakes them and there is a

[69] Forest & Stream, Dec. 26, 1896, p. 511.

[70] Amer. Nat. Hist., 1904, p. 24.

fight. At night the Coyotes come immediately up to the door, and can be heard all about the house and buildings, and at this time the Dog is kept busy chasing them.

"Not very long ago, the Coyotes appeared to have made up their minds that they wanted to get rid of this Dog. About 9 o'clock at night one of them came to the kitchen door and howled. The Dog rushed out after him and the Coyote ran away, looking over his shoulder. He ran down toward one of the corrals and around behind the blacksmith's shop into the garden, and the Dog followed him at the top of his speed. Behind the blacksmith's shop and waiting for the Dog were 6 or 7 other Coyotes, who at once pitched into the pursuer and proceeded to worry him.

"The noise of the fight led Billy C. to seize his gun and rush out there, and he saw this snarling, writhing mass of animals on the ground. He could not shoot for fear of killing the Dog but at his yells the Coyotes scattered and disappeared. He was only just in time to save Shep, who was badly cut up. Since that time Shep's interest in Coyotes has somewhat lessened. He will chase a single one with his old vigour, but if a second appears, he returns to the house."[71]

Mary Austin gives an admirable picture of a prowling Coyote in her "Land of Little Rain" (1904, pp. 30–31): "Watch a Coyote come out of his lair," she says, "and cast about in his mind where he will go for his daily killing. You cannot very well tell what decides him, but very easily that he has decided. He trots or breaks into short gallops, with very perceptible pauses to look up and about at land-marks, alters his tack a little, looking forward and back to steer his proper course.

"I am persuaded that the Coyotes in my valley, which is narrow and beset with steep sharp hills, in long passages, steer by the pinnacles of the skyline, going with head cocked to one side to keep to the left or the right of such and such a promontory.

"I have trailed a Coyote often, going across country, perhaps to where some slant-winged scavenger hanging in the air signalled prospect of a dinner, and found his track such as a man, a very intelligent man accustomed to hill country and a little cautious, would make to the same point. Here a detour to avoid a stretch of too little cover, there a pause on the rim of a gully to pick the better way—and it is usually the best way—and making his point with the greatest economy of effort."

"The Coyote constantly uses his wits," says Enos A. Mills. "In a Utah desert I often saw him watching the flights of buzzards. If the buz-

[71] Forest & Stream, Dec. 26, 1896, p. 511.

PLATE LXXVI.—COYOTE IN SUMMER COAT
Life study by E. T. Seton, September, 1886

PLATE LXXVII.—COYOTES IN NEW YORK ZOOLOGICAL PARK
Photographs by E. T. Seton

zards came down, the Coyote made haste to be among those at the feast. In returning from a far-off expedition on plain or desert, he seems to be guided by landmarks; appears to recognize striking objects seen before and to use them as guideposts."[72]

An interesting account of the "Coyote as a Strategist" is given by A. Meacham, of Washington. He says after sundry illustrations: "But the best specimen of the cunning of the Coyote is illustrated by the way in which it captures young Pigs from their mother. In this kind of a chase 2 Coyotes combine their efforts. One of the two attracts the attention of the sow, bites at it, and fights it and leads it away from the young Pigs. The other Coyote then snatches up the Pig and away it goes with its little porker. This instance is well authenticated, and has happened more than once in districts where hog-raising is common. Can any of your readers furnish a better instance of cunning or strategy on the part of any wild animal? Should it not be conceded that the Coyote is a close observer and even a pretty close reasoner? Is it not entitled to some respect for its cunning as a hunter?"[73]

His Courage

Most books of Western sport describe the Coyote as cowardly, etc., because it does not elect to walk up openly to a pack of huge Dogs that are backed by irresistible forces in overwhelming numbers.

Is there a man on earth who has a 25-pound Dog and is willing to match that Dog fairly against a 25-pound Coyote?

Is there a man on earth who, armed only with nature's weapons, and single-handed, is willing to enter a tight enclosure and try grips to a finish with one little Coyote?

I trow not. Neither Dog nor man has valour enough to meet the Coyote on equal terms. Therefore, ye dog-men, refrain for ever from calling the Coyote a coward, for it makes it appear that much worse for you and your Dog.

It takes a wonderfully valiant Dog to kill a Coyote. Yet I knew a collie, "Old Frank," the property of my neighbour, John Thompson, of Carberry, Man., that had several times run down and singlehanded killed Coyotes. I saw him actually perform this feat in the November of 1882. The Wolf faced him again and again, but he managed each time to escape serious injury from its jaws, and when the Wolf turned to fly he would snap at its rear. On skinning the Wolf, I found that the Dog's teeth had sunk

[72] Watched, p. 94.

[73] Forest & Stream, Jan. 17, 1903, p. 48.

deep into the Wolf's flesh each time, so that its hind-legs were disabled. This Wolf, however, died gamely fighting, though the Dog was three times his weight and was backed by men with guns.

In my early days I caught a great many Wolves in traps—many scores, if not hundreds—and I found great diversity of behaviour among them at this trying time. Some were utterly cowed and submitted to the death penalty in sullen silence; others struggled to escape; some yelled defiance; and not a few barked and growled savagely, trying to reach me, raging and defiant to the end.

The following incident which looked like a "show-down" between a Coyote and a Bobcat (or maybe two, each of which was probably his own weight), proves very clearly that the Coyote in his native range is not afraid to stand valiantly for his rights. The incident was witnessed by one of the Biological Survey hunters whose district is near Gardner, Colo. He writes:

"To-day (Dec. 26, 1923), while riding from the Dietz ranch to the head of Cottonwood Creek to follow a poison line down the Creek and back to the ranch, about 6 miles from camp I was attracted by a barking noise that sounded like a Dog going into a hard fight. In some tall timber which had a thick undergrowth, I was led by the noise. At this point I got a glimpse of a large Coyote and large Bobcat having a real battle. I could not shoot either of the animals from the Horse I was riding, as it was very scary. I dismounted, all the time watching the fight, and then I tied the lines of the bridle to the foreleg of the Horse.

"The Bobcat and Coyote discovered me by this time, and as they ran, I fired and shot at the Bobcat through the thick timber, but did not stop it. In a nearby tree, I noticed another Bobcat which was not taking any part in the fight, but evidently was looking on; I succeeded in shooting this Cat, killing it.

"From all I saw, the Coyote seemed to be pushing the fight, but the Cat refused to take a tree. The snow was gone from this particular ground where the fight occurred, and was only to be found in patches. I could tell from the snow that the Coyote and Bobcat had moved some as they fought.

"This particular Coyote had the nerve to take hold of this very large Bobcat four or five different times. I could see from the sign that the fight had been on for some little time. At one place in the snow, the Bobcat showed full print of his body stretched out on its side, and looked as if the Coyote had thrown him from the way they had torn up the snow. There was plenty of fur from both the Bobcat and Coyote to be plainly seen."

A Social Scrap

In Aug., 1886, I saw 2 female Coyotes fight in a cage. They snapped chiefly at each other's necks. The victor, however, disabled and subdued the other by a serious bite in the fore-leg, then amused herself by growling and urinating elaborately over the fallen foe—a treatment to which the vanquished submitted with every appearance of abject fear.

This disposition to spurn and insult a conquered enemy seems peculiar to the Dogs. Nothing of the kind is observable in the Cats. When a Cat's enemy flies, the victor is done with him, but in a Dog, flight of the foe is the strongest incentive to pursue for a time at least and cover himself with glory.

A Rogue and His Practical Jokes

There was a time when men claimed that man alone had a sense of humour, that man alone had invented play-games.

It seems safe to say that every animal treated in this work plays at games, and therefore, to some extent, has a sense of humour. None of them excels the Coyote in this last particular.

Many times have I known a Coyote tempt a Dog to chase him, then at a safe distance from the Dog's human helpers turn on him and drive him back with noisy demonstrations that looked like a wild, hilarious jest. Every ranchman and camper in the West can tell some similar experience.

Another practical joke that thousands of Coyotes have played is to cut the picket ropes of a Horse, and so turn the animal loose and set the hunters afoot.

G. B. Grinnell writes of Coyotes in a new frolic: "Last winter Billy reported to me that he saw two of them on a big piece of ice bothering a big Wolf. The ice was slippery and they could get started and could turn much more quickly than their larger cousin. One of them would go in front of him and annoy him while the other ran past him from behind and nipped him as it went by. Then the big Wolf would try to turn and chase the little one, but he would slip, and before he fairly got started, would get a nip from the other. So they worried this old fellow for quite a little while, and were still at it when Billy went out of sight."[74]

Again, on the same page, he tells of a game, possibly friendly, between a Coyote and a Badger: "A few weeks ago, while riding out to look at a bunch of Cattle, I saw as I rode, going over a little hill near the house, a Coyote down in the next valley, and with the Coyote was a Badger. I had no gun, and the Coyote seemed to know it, for he paid no attention to me, but ap-

[74] Forest & Stream, Dec. 26, 1896, p. 512.

peared to be playing with the Badger. He would prance around it, make a feint of biting it, and then run off a little way, the Badger immediately running after him. This he did until the Badger had gone 60 or 70 yards, when I got so near the two that the Badger saw me and ran into a hole, and the Coyote trotted off 40 or 50 yards and lay down. I did not comprehend just what was going on, but it was evident either that the two animals were playing together, or else that the Wolf was teasing the Badger."

Enos A. Mills was well aware of the Coyote's love of play. He describes at length a rough merry-making that a Coyote had with a Blackbear cub. This appears in the "Blackbear Life" Vol. II.

But recognizing the Coyote's wonderful gift of song, Mills says: "The characteristic play of the Coyotes is noisy. They have concerts full of howls, barks, and yelps, in ever-varying combinations. These players have regular places for assembling, and both singly and collectively send their wild notes flying at different angles off into the night. There are weird, ventriloquial effects which sometimes multiply and reproduce one yapping, yelping entertainer into a scattered number. At other times the howler so transfers his voice that it seems to issue from a point widely separated from the owner. But sometimes this clown of the prairie forgets singing to the stars, and in silence has games and contests which require speed and skill."[75]

The Kindly Coyote

E. Roy Connelly, of Regina, Sask., sends me on Aug. 17, 1913, an enlightening account of his pet Coyote. It brings out the bright friendliness of the Coyote. I gladly reproduce his letter:

"I have a Prairie-wolf or Coyote cub about 4 months old, which is quite a pet. I have had it for nearly 3 months, and recently let it run loose most of the time, as it won't go far away. Last night it was loose but turned up for breakfast this morning. He will answer my whistle like a Dog and will also run after a stick and bring it back to me. I give him a bath every little while, and he enjoys it after he begins to dry. I have often had more trouble in bathing a Dog. When I first got him, I fed him principally on bread and milk with a little cooked meat and fish. Then I was away for a month, and the boys, of whom there were 10, at the house fed him a good deal of cooked meat, and now he thinks he should have that all the time, but likes eggs, candies, and many other things. I find him very intelligent, and at times affectionate. He is very playful and shows no fear of a Dog; in fact, he goes right up and wants to play. A fox-terrier comes around at times

[75] Advent. Nat. Guide, p. 206.

and they have a great time together. I bring him in the house sometimes, and he goes after the rugs and cushions pretty hard."

But the brightest light, the most suggestive statement I can find, that bears on the spirit of this brave and kindly creature, is in the following by Enos A. Mills: "I have also seen one or more Coyotes stay near a crippled Coyote as though taking care of him, and endeavour to lure away any hunter who approached."[76]

A Sociable Little Beast

The species is but slightly gregarious. The most I have ever seen in one day was 8, and the most at one spot was 3. They were gathered at a dead calf and scattered immediately after their feast. Three is the most I ever saw travelling in company. The most I have heard of together was 12, also attracted by a carcass. W. R. Hine tells me that he has seen 5 together, never more; these were at a dead animal; and the most he ever met with in one day was a dozen during a 60-mile drive along Red River, Man., in the autumn.

Six Coyotes, *i. e.*, 3 pairs, were seen by Lew Wilmot as they were chasing, a Deer in the spring of the year at Oroville, Wash.[77]

Eight Coyotes were seen together in August by Henry W. Wende, of Sunnyside, Wash. They were near a drinking place in the Yakima Valley and may have been a family, but they looked fully grown.

A dozen are the most in one band that I can learn of. These were seen and heard near Humboldt by Professor John Macoun on Oct. 15, during his journey from Fort Carleton to Winnipeg in 1875. Early one morning, as he sat by the fire after his wagon had gone, they gathered about him, and sitting on their haunches some 75 yards off, all howled their loudest.

As will be shown later, the Coyotes frequently combine their efforts for the common good, although they do not habitually go or live in bands. I should therefore say the species was sociable though but slightly gregarious.

The cases recorded by Lew Wilmot are full of observations that reflect light on the Coyote as well as on the hunters. They are dated Oroville, Wash., March 22, 1897, and appeared in *Forest & Stream* for April 10, 1897, p. 284, as follows:

"A few years ago along in the spring I took my rifle and started up into the open hills to kill some grouse, and when I got up on to the top of a small ridge that puts down between my creek and the Columbia River, I stood still for a while listening for a grouse to hoot.

[76] Watched, pp. 85–6.

[77] Forest & Stream, April 10, 1897, p. 284.

Plate LXXVIII. Coyote Studies
by E. T. Seton.

"Across from where I stood was quite a high mountain, covered with bunch grass and a few scattering pines; the snow had not all gone, especially near the top. I had not stopped very long when I saw a Deer coming over the hill, and from the way it was coming, I knew there was something after it. Soon I saw 2 Coyotes down to the right, and the way they were running I thought they were trying to head the Deer off from the river. Soon I saw 2 more on the trail, and then I saw 2 more to the left [3 pairs undoubtedly], and it looked to me as if those that were on the flanks were running the fastest. There was a crossing in a gap in the ridge I was on, and I knew the Deer would come through that gap; so I ran down toward the gap; not that I wanted to shoot the Deer, but I wanted to shoot at the Coyotes that were on the Deer's track.

"I had not got quite down to the gap when the Deer came through. It was a Whitetail buck, and he was doing his best to get to the river. I had but a short time to wait when the 2 Coyotes came along. I whistled when they got opposite to me, and they stopped and looked up. I fired at the one that looked the largest. At the crack of the rifle it started and ran as fast as it could for about 50 yards and rolled over dead. The other followed it for a few yards and then turned off up the hill, and when it saw its mate roll over it stopped. I shot at it, and as I did not make the right allowance for distance, undershot and broke one of its legs. I put my Dog after it and he soon brought it to bay, and I had the satisfaction of killing it." Here we have what was almost certainly 3 mated pairs, for it was March, uniting to tackle a prey too strong for any 2 Coyotes.

What looks like a sociable gathering to enjoy much smaller game, is set forth by the same old-timer, thus:

"On another occasion I was coming down from a neighbour's, and when near the bottom on the Columbia, I noticed a couple of Coyotes hunting through the grass and low bushes; they had their tails up like a Dog, and seemed to be as busy.

"Soon they were joined by 2 more and all had their tails up, and as they had not discovered me, I waited to see what they were after. I never saw Dogs hunt through a flat more diligently than they did, and it looked so amusing to see them with their tails up. I think they were hunting Chipmunks. Not having anything to shoot with, I started on, and when they saw me they trotted off up the gulch, but lowered their tails, Coyote-like.

"I have often been told by white men and by Indians that they had seen as many as 15 after one Deer. This winter while on a trip to Curlew, I had to go down on Kettle River, and I saw where 6 Deer had been caught by Coyotes. I examined to see whether any big Wolves had been among

them, but did not see a track. An old Indian told me that a few days before, the Coyotes had run a Deer down on to the ice and caught it, and he heard it bleat and he ran down, but when he got there they had almost eaten it up."[78]

Intercommunication of ideas is well developed among Coyotes, which may be claimed as a proof of sociability. The smell-telephone with the smelling posts is largely used, as described in the Wolf chapter; but they also communicate many ideas by example.

Their remarkable vocal powers are at least as important as any. The principal sounds they utter are described in another paragraph.

The Wild Song in the Dark

The voice of the Coyote is one of its most remarkable gifts.

Barking is supposed to be limited to the Dog and the Coyote. This is not strictly true, for Wolves, Foxes, and Jackals bark at times, but it is true that the Coyote is the only wild animal of the family that habitually barks.

We must assume, as general propositions, that nothing in nature is without adequate cause, and that it is always worth while to search that out. Most of the many calls of the Coyote are signals to its companions, but some of them seem to be the outcome of the pleasure it finds in its own music.

The most peculiar of its noises is the evening song, uttered soon after sunset, close to camp at times. This is a series of short barks, increasing in power and pitch till it changes into a long squall. One Coyote begins, and immediately two or more join in, making so much noise that newcomers think there must be a hundred Wolves out there. It is kept up for perhaps a minute or two, then ceases till some new impulse seizes them. Aug. 27, 1904, in W. F. White's menagerie at Winnipeg, I saw a Coyote pup, which, though little bigger than a House-cat and less than 3 months old, had a fully developed voice, and, much to the amusement of numerous bystanders, joined in the yapping chorus as lustily as his grown-up relatives. I think that both sexes sing.

I never heard the chorus among wild Coyotes while the sun was above the horizon. In the evening, it comes first with the gloaming, and in the morning is unknown after dawn.

In captivity, it is often enough heard by day. A favourite time is at noon, when the blowing of whistles seems to be the immediate cause, or possibly only the last touch that precipitates the event.

[78] Forest & Stream, April 10, 1897, p. 284.

Another note I have heard them utter toward dawn is a long, smooth sound, of truly musical quality. I have sometimes mistaken it for the fluty call of a loon to his mate.

I once knew a Coyote that would stand around the ranch till the small Dog went valiantly after it. The Coyote would run till at a distance that made it safe from guns, then turn on the Dog and drive him back ignominiously to the shelter of the house. Of course, the Dog soon learned that the enemy was not so "easy" as he looked. On each occasion when the Coyote turned, he uttered a series of gurgling, growling barks, that seemed to strike terror into the Dog and were to me an entirely new Coyote "song."

The sound the old one utters when the young are in danger, is described as a prolonged, quavering yelp or squall rising in pitch towards the end.

In their vespers A. S. Barton notes an interesting habit. Two or three Coyotes will meet each night on a certain elevated place to sing. They have several of these recognized choir-lofts, but they never use the same on two nights in succession. Sometimes at Turtle Mountain, on dead calm moonlit nights, each Coyote mounts his singing perch and pours out his wild free soul in a prolonged outburst of his loudest and finest notes. This is passed on from one to another, till the whole mountain seems ringing with the stirring music, and, from its very weirdness and the vast stretch of the country that is concerned, the effect is truly impressive.

Enos A. Mills is one of those sympathetic students of the wilds who have lived the Coyote life and learned to rejoice in it. His description of the Song-dog's music and magic power will surely voice the unspoken thrills and understanding of many a lover of the West.

"The Coyote," he says, "uses his voice for other things than pleasure. He has a dialect with which he signals his fellows; he warns them of danger and tells of opportunities; he asks for information and calls for assistance. He is constantly saving himself from danger or securing his needed food by coöperating with his fellows. These united efforts are largely possible through his ability to express the situation with voice and tongue."[79]

"Through repetition, a Coyote's signals are ofttimes relayed for miles. A leader mounts a lonely butte and proclaims his orders over the silent prairie. This proclamation is answered by repeating Coyotes a mile or more away. Farther away, at all points of the compass, it is repeated by others. And so, within a fraction of a minute, most of the Coyotes within a radius of miles have the latest news or the latest orders.

"Sometimes the stratum of air above the prairie is a mellow sounding

[79] Watched, p. 96.

board; it clearly and unresistingly transmits these wild wireless calls far across the ravines and hills of the prairie. The clear notes of a single Coyote often ring distinctly across a radius of 2 or 3 miles. When groups congregate in valley concerts, all the air between the near and the far-off hills vibrates with the wild, varying melody. This may reach a climax in a roar like the wind, then break up into a many-voiced yelping.

"I love to hear the shoutings and the far-off cries of the Coyote. These elemental notes are those of pure gladness and wildness."[80]

The Spirit of the West

O Wonder Dog of the West! O Song-dog of the Dawning! more than any other creature, the symbol of the medicine-making West! How I wish I could do justice to your spirit, to your meaning, to your way of life! If I could only voice the fierce, sad joy that you engender in me!

In memory's eye, I see you as I used to see, perched on some upper perch, where, spread a little lower, was the Prairie-dog town, the teeming village of your vassals that owed you a living. I see you as I used to see, exchange a swift, yellow-eyed blink with the Wonder-she near by, your partner, your loved one. I see that comprehending, informational arrangeative blink of the eye. I see her crouch as you stalk openly forward, down and on, to the dog-town with its yapping, contemptible fat ones—stalk on alone, as though alone. And the chattering Prairie-dogs dodge down. Then, with a swift onset, your partner rushes out and hides behind some grease-wood bush that the Wistonwish left for reasons of his own.

Onward you march alone, and the chattering pot-bellies stick out their heads, seeing you, seeing you far away, and knowing nothing of the keen-eyed partner, sandy yellow on the yellow sand behind the grease bush. Now the Yappers grow bold and one ventures to seek for the food farther off. Then with a rush, the sandy yellow furry one is on him, chops him, and you come back to share the feast with your dear one.

Not much it takes to keep you happy, for you are in love, O Coyote! And also you have everything—food and health and strength, good hunting, and love. You could not be other than happy.

You sleep near each other under the shady yuccas. The red sun goes down, the cool of the evening is on the vast campagna that shimmered in the low-noon heat.

You are roused from sleep; you are impelled by the life-forces in and out of you to be up and doing. Your spirit is stirred, is uplifted, so not mere action can express your thrill, your exaltation; and like the prophets

[80] Watched, pp. 96–97.

and saga-singers, you voice your spirit's thrill in a song, a shouting, that is the very same in nature with the love-mad song of the nightingale, only louder, stronger, farther-reaching, as becomes the nobler, singing thing that you are.

Every plainsman in the West has heard and learned to love your song, and every dweller in the West that is to be will know it well, for still it sounds from the level buttes in the early dark.

Sheep-men may rage and governments set a blood-price on your head, —but wise are you as you are swift and brave.

From all parts of the West comes the same rejoiceful news—the Coyote holds his own and is even winning wider lands, and defies the cleverest machinations of the all-destroying Whiteman. How complete was the Redman's understanding when he called you the " Wonder Dog," and made you the incarnation of the Deity, the one who brought the divine fire to earth in the beginning, the one who will live to see it die when all the world is dead.

If ever the day should come when one may camp in the West, and hear not a note of the Coyote's joyous stirring evening song, I hope that I shall long before have passed away, gone over the Great Divide, where there are neither barbwire fences, nor tin cans, nor hooch-houses, nor improvement companies, nor sheep-herds, nor flies, but where there is peace, and the Coyote sings and is unafraid.

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LIFE X—THE DESERT COYOTE

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Desert Coyote, Arizona Coyote, Mearns Coyote, Dry Coyote, Little Coyote

Canis mearnsi Merriam

(L. *mearnsi* in honour of Dr. E. A. Mearns who discovered it)

Canis mearnsi Merriam, 1897, Proc. Biol. Soc., Washington, II, p. 30, March 15.

Type Locality—Quitobaquita, Pima County, Ariz.

It is not easy to distinguish the Desert Coyote from the Coyote of the Plains. Merriam's characterization of it is as follows: "Size small; ears medium; colouration rich and bright, the fulvous tints exceedingly bright and covering the whole of the fore and hind legs and feet. Skull and teeth small."[1]

Thus the small size and bright colours are the strong features, but I have found specimens that showed all grades between a *latrans* colour and *mearnsi* colour. And, as will appear later, there is but slight difference in size. There can be little doubt that, in a broad sense at least, there is only one Coyote over-species. And as such I shall treat it for the purposes of life-history.

Nevertheless, the Desert Coyote has some peculiar habits born of the desert; therefore I give a brief sketch of its life on the sands.

Size. Total length of a ♀, 43½ in. (1104 mm.); tail, 13 in. (330 mm.); hind-foot, 7⅛ in. (180 mm.). These dimensions, though not maximum, it will be noted, can be closely matched in *latrans*.

Weight of adult ♀ from Trumbull Mountains, Ariz., 25 lbs.

Colour. "Muzzle cinnamon rufous; space between the eyes grizzled grayish and fulvous; top of head, nape, and ears rather light fulvous; rest of upper parts buffy-ochraceous bountifully mixed with black-tipped hairs (under-fur bright buffy-ochraceous [*i. e.*, their tips]); under-parts in pectoral and inguinal regions whitish, middle part of belly suffused all the way across with buffy-ochraceous; throat buffy, the long hairs black-tipped; fore- and hind-legs and feet bright orange fulvous all round; upper side of fore-legs

[1] Revision of the Coyotes or Prairie Wolves, with Descriptions of New Forms, by C. H. Merriam, Proc. Biol. Soc., Wash., XI, Mar. 15, 1897, pp. 30–31.

moderately mixed with black; under side of tail pale fulvous, whitish at very base, hairs of distal half black-tipped; extreme end of tail black, usually with a few white hairs.

"*Cranial and dental characters*—Skull and teeth small and light as in *C. estor;* a little larger than in *C. microdon* from Mier, Tamaulipas.

"*Remarks—Canis mearnsi* is the handsomest of the Coyotes. It differs from *C. microdon* of the Lower Rio Grande region in slightly larger size and in the greater extent and much brighter tints of the fulvous parts. The fore- and hind-legs and feet are bright orange-fulvous all round; in *C. microdon* the fulvous is deeper and duller and the white of the inguinal region reaches down on the inner side of the hind-leg to the ankle and covers the upper surface of the foot, and in the fore-leg a white stripe reaches all the way down the posterior aspect of the leg to the wrist. Compared with *microdon*, the throat and middle part of the belly are more ochraceous and have fewer black-tipped hairs—the belly practically none. The skull and teeth of *mearnsi* are almost exactly like those of *estor*, but in colouration the two animals differ so widely as to require no comparison. Nevertheless, specimens collected by Doctor Mearns at Tinajas Altas, Ariz., are so much paler than typical *mearnsi* as to suggest intergradation."[2]

Range

Though accredited only to a limited area that includes a small part of Southern Arizona, the southwestern point of New Mexico, and Sonora, there can be no doubt that it covers a somewhat greater territory and that it intergrades into the other desert forms, which are found throughout the extremely arid country of the Southwest, mainly within the Lower Sonoran Fauna. This is one of the hottest and most arid regions of the continent, yet the Coyote finds plenty of food, and although not beset by the terrific biting blizzards that are the winter trial of the big Northern Coyote, he has to endure the furnace-like heat of summer, with long occasional periods of drought, when water-holes become dry, plant life becomes dormant, and a large part of the smaller mammal life perishes. Nevertheless, it must be remembered as an axiom, given food enough, most animals are indifferent to climate, and this is not only true of the Desert Coyote, but possible of a still larger interpretation, for given succulent food enough, the desert animals can commonly dispense with water. This is not absolutely proven for the Coyote, but it is proven for several other creatures that elsewhere drink copiously, and in the hot sandy regions, never drink at all.

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[2] C. H. Merriam: Revision of the Coyotes, pp. 30–31.

Food

The Desert Coyote is, of course, omnivorous, like its kinsfolk. "In seasons of plenty," says Nelson, "Rabbits, Kangaroo-rats, Pocket-gophers, and many other desert Rodents cost only the pleasant excitement of a short stalk. With the changing seasons the flesh diet is varied by the sugary mesquite beans, juicy cactus fruit, and other products of thorny desert plants. Wherever sufficient water is available for irrigation, small communities of Indians or Mexicans are to be found. About such centres many Coyotes usually establish themselves and fatten on poultry, green corn, melons, and other fruits provided by the labour of man. Many of them also patrol the shores of the Gulf of California and feast upon the eggs of turtles and other spoils of the sea.

"The arrival of men at a desert water-hole is quickly known among these alert foragers and when the travellers arise at daybreak, they are likely to see the tell-tale tracks on the sand where one or two Coyotes have walked in and out between their sleeping places and all about camp. Shortly afterward the campers, if inexperienced, may learn that bacon and other food are contraband and always confiscated by these Dogs of the desert. These camp-marauders often stand among the bushes only 75 or 100 yards away in the morning and watch the intruders with much curiosity until some hostile movement starts them off in rapid flight."[3]

My own acquaintance with the Desert Coyote was made on the Mohave Desert, near Imperial Valley and in the region south of Tucson. There was nothing in its food, habits, haunts, or tracks to distinguish it from its big gray kinsman of the Northern Plains, and each evening and each dawning it sang the same wild thrilling song from a safe distant rising ground as does the Song-dog of the better-watered Plains.

[3] Wild Animals of North America, p. 424.

LIFE XI—THE ARCTIC FOX

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Portrait of an Arctic Fox by E. T. Seton . 1923 -

Arctic Fox, White Fox, Polar Fox, Stone-fox, Blue-fox, Brown Fox, Sooty Fox, Pied Fox, Greenland Dog, Snow-dog, or Isatis

Alopex lagopus (Linnæus)

(*Alopex*, Greek for Fox; *lagopus*, hare-footed, from Greek, *lagos*, a Hare and *pous*, foot; because its soles are covered with a dense, bristly coat as in the Hare.)

Vulpes lagopus Linnæus, 1758, Syst. Nat., 10th ed., p. 40.
Alopex lagopus Kaup, 1829 Skizzirte Entw. Gersch. u. Naturl. Syst. Europ. Thierw., I, p. 83

Type Locality—Lapland

French Canadian, *Renard blanc*, *Renard bleu.*
Cree, *Wappeeskeeshew*, *Makkeeshew.*
Eskimo, *Ka-túg-u-li-a-guk.*
Chipewyan, *Et-thip-py.*
Siberian (probably), *Isatis*, the aboriginal name offered for our use by Buffon who got it from Gmelin, 1760.

The genus *Alopex* (Kaup, 1829) was established with the White Fox of northern Europe as the type. It differs from the true Foxes of the genus *Vulpes* in the skull, which is intermediate between those of *Vulpes* and *Canis*, and in the ears, which are short and rounded.

G. S. Miller cites Collett's *Norges Pattedyr* (1911, p. 275), for evidence of the complete sterility of Arctic Fox and Red-fox, indicating wide physiological divergence between them, though they were long referred to the same genus. (Mamm. West. Europe, 1912, p. 319.)

In general form, *Alopex* is like *Vulpes*, but the muzzle is shorter, and the soles of the feet are covered with the dense woolly hair already mentioned as giving the specific name. In summer, it has a coat of short fur which is brownish gray; in winter, its fur is very deep, dense, soft, and everywhere pure white.

To these generic characters, the White Fox adds the following:

Size. Length, 31 in. (787 mm.); tail, 10¼ in. (260 mm.); hind-foot, 4½ in. (115 mm.).

Weight. (Pribilof race) ♂'s, usually 8 to 14 lbs., but as low as 5½ lbs.,

and up to 20¼ lbs.; ♀'s usually 7 to 10 lbs., but as low as 4 lbs., and as high as 20¾ lbs. A new-born pup weighed 2¼ oz.[1] It will be noted that it weighs about the same as the Polar Hare.

Lyon says of the White ones taken at Winter Island: "The general weight was about 8 lbs., although some were as low as 7, and a few as high as 9½, when in good case."[2]

Near Cape Sabine where Greely killed 20 Blue-foxes and 5 White, the Blue averaged 3½ lbs. each, the White 4½.[3]

Colour. In summer. A typical specimen of *innuitus*, dated July 19, 1909, from Kuparok River,on the north coast of Alaska (Am. Mus. 31331), is as follows: All above, including the broad bar across the shoulders, the upper surface of the tail, the outer side of each limb, and the entire head, sooty brown, darkest on the head, and more or less peppered with light tips to the hairs. All the under-parts and flanks of a dull yellowish white, which on the flanks, haunch, and breast is tinged with buff. The head and paws, grizzled with a plentiful sprinkling of white hairs; ears, lined and edged with white. A few long, scattering white hairs of the winter coat are still found all over this skin.

In winter, the coat is pure white all over. The black nose and light hazel eyes alone break the exquisite white purity of its snowy fur, making a protective colouration of bewildering completeness. If the Fox be at a very little distance, sitting or running, it is nearly impossible for the eye to follow it. The tail gland is well developed, but the fur must be separated before any tinge of the yellow musk is seen.

In the *blue* phase, the coat is quite different from that of the summer. It is everywhere bluish drab, or smoky, washed with brownish on head and feet, and with a few white hairs on face and throat. The strong woolly hair on the soles of the feet, dull yellowish white, as in the white-coated animal.

The blue phase is, in some respects, to the White Fox what the black phase is to the Red-fox or to the Graysquirrel; that is, a mere colour freak found in nearly all parts of the region which the creature inhabits. Both colours occur, indeed, in the same litter, as also in the Graysquirrel, of which the black form is found chiefly in the North, so the Blue-fox is the predominating Fox type on the islands of the Bering Sea; it is rare elsewhere and becomes more so as one goes east, except that, according to Prof. Alfred Newton, in Iceland nearly all the Foxes retain their dark livery the year round.[4]

[1] Prib. Ids., p. 111.

[2] Priv. Jour., p. 74.

[3] 3 Years, II, p. 368.

[4] Proc. Zoöl. Soc., 1864, p. 497.

On Pribilof Islands, the white-coated Foxes, never very numerous, have been largely eliminated. The same condition obtains on the Aleutians.

In Siberia, Captain Hooper of the U. S. S. *Corwin* found Blue-foxes more plentiful than on the American coast.[5]

As Richardson points out, the majority only of these animals "acquire the pure white dress even in winter; many have a little duskiness on the nose, and others, probably young individuals, remain more or less coloured on the body all the year. On the other hand, a pure white Arctic Fox is occasionally met with in the middle of summer and forms the variety named *Kakkortak* by the Greenlanders."[6] Greely's party caught one Sept. 16th.[7] This parallels the case of the Greenland Hare, which is white the year round, and probably arises from the same cause—the summer season is too short to allow for a complete change to the summer dress.

The colour of the White Fox for several months after it is born is very similar to the adult Blue-fox's normal pelage.

"At St. Michael's," says Nelson, "among the thousands of skins brought in each year, not over 1 Blue-fox was observed among every 15 or 20 White Foxes, and the proportion was sometimes less. I afterward found this proportion to hold good for the skins seen among the Eskimo of the Bering Strait Islands and the Alaskan and Siberian Arctic coast in the vicinity of the Strait. Farther to the north, the Blue-fox becomes more and more scarce. The habits of the two forms are identical."[8]

Races

The following 6 forms of the Arctic Fox have been recognized, 4 of which are North American:

lagopus Linnæus, the typical form; European, but believed to extend eastward along the Siberian coast, and even to Bering Island in Bering Sea; probably not American. White in winter. T. l., Lapland.

innuitus Merriam, similar cranially to *lagopus*, but with braincase broader and more pyriform. White in winter. T. l., Karogar River, Point Barrow.

ungava Merriam, similar to the last, but slightly larger. White in winter. T. l., Ft. Chimo, Ungava.

pribilofensis Merriam, largest of these Foxes, skull much elongated,

[5] Petroff: Fisheries & Resources of Alaska, 1897, III, p. 255.

[6] F. B. A., I, p. 84.

[7] 3 Years, II, p. 3.

[8] Nat. Hist. Alaska, p. 241.

almost like that of a Red-fox. At all seasons, a sooty blue all over. T. l., St. George Island, Pribilof group.

beringensis Merriam, nearly the same size as the last, but with shorter, broader rostrum. At all seasons, of a sooty blue. T. l., Bering Island, at the Asiatic end of the Aleutian Chain.

hallensis Merriam, similar to *lagopus*, but smaller, with shorter, broader skull. T. l., Hall's Island, Bering Sea.

Range, with Map

In general, the range of the White Fox is circumpolar, extending as far south as the timber line and as far north as there is land. It is found in all the Arctic portions of the Asiatic and European mainlands. In America, its range is as shown on the map, keeping exactly to the limits of the Arctic Zone, and covering all of the Arctic Islands from south Greenland to Point Barrow at least, from Banks Land to Iceland, and from 83° 24′ on the north (which happens also to be the northern limit of land), to the southern limit of the Arctic fauna.

One by one, the Polar Islands have been entered on the Fox map by Arctic explorers. It is unnecessary to give all these records; I spot the map only with those around the outside. If the edges of the carpet are well nailed down, one need not worry about the inside breadth. These, then, hold down the edge: Prince Patrick Island (Sledging Party of *Resolute;* see Jones's *Arctic Manual*, 1875, p. 498); Melville Island, found throughout the year (Parry's "Second Voyage," 1824, Suppl. p. clxxxiv); Beechey Island, North Devon and Bering Bay (McCormick, "Voyages," 1884, II, pp. 63, 120, 142); Banks Land (A. Armstrong, "Disc. N. W. Pass.," 1857, p. 426).

The following note by Captain McClintock shows that on the Northwest Parry Islands the Fox is rare:

"No trace of Oxen, Deer, Foxes, or ptarmigan beyond the 77″ parallel, except in one instance, when a decayed bone of a Deer and traces of a Fox were found. Up to 77° N., Fox tracks were frequently seen, although we never saw the animal. Lemmings were tolerably numerous wherever there was vegetation."[9]

In Grantland, Gen. A. W. Greely found the Arctic Fox common up to lat. 82°N., and mentions it frequently in his "Three Years of Arctic Service."

It is common along the coast line of west Greenland between lat. 60° and 61°.[10]

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[9] Quoted by T. Rupert Jones in Nat. Hist., etc., Greenland, 1875, p. 498.

[10] Dan. Greenland, pp. 104–05.

MAP X RANGES OF THE ARCTIC FOX AND OF THE GRAY-FOX

By E. T. Seton, with assistance of the Biological Survey, 1923

The Arctic Fox range is north of latitude 50° with the exception of the Prince Edward Island record and the Anticosti record. The east coast of Greenland is included on the general statements of Rink, Wright, and Rasmussen, but without specific localities. The dots are records discussed in the text.

The Gray-fox range is entirely south of the Canadian boundary, with the single exception of the Ontario record on the north shore of Lake Erie. This and the northern Michigan records are set forth in the text. The four forms of the Santa Barbara Islands are not entered on this map.

Rasmussen records "the Polar Fox occasionally observed,"[11] on the northmost coast of Greenland in 1918.

In Iceland and Spitzbergen, the Arctic Fox is well known. Neils Horrebow says: "Foxes are the only wild beasts in Iceland, and of them there is great store."[12]

Furthermore, Prof. Alfred Newton says: "I have never seen it remarked, though it is unquestionably the case, that nearly all the Icelandic examples of *Canis lagopus* are 'blue Foxes,'" that is to say, their winter coat is of nearly the same colour as the summer coat.[13]

In Alaska, Nelson says, it is of general distribution over the Tundras or Barrens. His statement, referring to the normal phase only, is as follows: "Along all of the belt of open coast country north from the peninsula of Aliaska [*sic*] around all of the Bering Sea and Arctic shores of the Territory, these beautiful little animals are common residents. They are also found upon such of the islands of Bering Sea as they can reach upon the ice. They rarely find their way to the Fur Seal group, but are numerous on Nunevak, St. Matthews, St. Lawrence, and all the islands in Bering Strait. They are extremely numerous in all the open country lying between the lower Yukon and Kuskoquim rivers. Thence north to the Kaviak Peninsula they are less common, but in the latter district become numerous again, and are abundant in all the coast country to the north."[14]

Around the north coast of Labrador they are plentiful. In the migration they drift as far south even as the Gulf of St. Lawrence, and occasionally cross on the ice floe to Newfoundland; one specimen has been recorded from Cape Breton and two from Anticosti (see p. 433).

In America, the distribution of the blue coats, as a fixed and predominant phase, is limited to the region of Bering Sea. On the peninsula of Alaska, and especially on the Aleutian and Pribilof islands, the blue form almost entirely replaces the white. Farther north, the proportion of blue individuals decreases steadily, and those of the white form become more numerous, until near the northern limit of the mainland the blue form is almost entirely replaced by the white; that is to say, the white coat is the rule where there is deep snow and a long hard winter: the blue where they have little or no snow.

And yet at Cape Sabine, which is on the east coast of Ellesmere Land, near lat. 79°, in the winter of 1883–84, Greely "killed 25 Foxes of which 20

[11] Green., p. 299.

[12] Nat. Hist. of Iceland, 1758, p. 43.

[13] Proc. Zoöl. Soc., 1864, p. 497.

[14] Nat. Hist. Alaska, p. 239.

were the Blue-fox. They were killed every month from October to February inclusive."[15]

As a readjustor of this Snow-child's known habitat is the southward emigration craze discussed later, and the following extralimital records are evident results of this impulse.

Extralimital and Other Records Shown on the Map

At Carlton House, "only 2 were seen in 40 years."[16] In 1876, 5 were taken at Cumberland House; in 1873, 3 at Moose Lake; in 1884, 2 at The Pas, and 16 at Pelican Narrows; in 1886, 2 at Rapid River, and at Lac du Brochet 785; in 1890, 1 at Portage la Loche; a few on the south shore, and more (about 42) each year at the east end of Great Slave Lake; once taken on Peace River; about 23 each year from Fort Rae.[17] The U. S. National Museum has specimens from Kenai Peninsula and Kadiak Island. Osgood says: "One was killed by fishermen at Igagik in the spring of 1902. They are also said to be found in the Togiak District, and very rarely at Nushagak."[18] B. R. Ross records it from "the south shore of Great Slave Lake and a single blue one on the north shore."[19]

Taken in numbers at Fort Smith, Fort Resolution, and Fort Rae in 1900–01; at Fort Norman regularly; at Ft. Good Hope and McPherson.[20]

The Hudson's Bay Company men told me that in the winter it is often taken at Fort Chipewyan, as well as near Fond du Lac, at the east end of Athabaska Lake; also southward even as far as Cree Lake.

Once taken at Oxford Lake, and, according to J. K. MacDonald, Hudson's Bay Company factor at Norway House, the Foxes came in numbers to his Post in 1900–01.[21]

To James Bay, southern part, Hamilton Inlet, Hebron, Belle Isle, Lake Michikamaw, and to Lake Nichicum.[22]

Owen Griffith, Hudson's Bay Company factor at Albany Post, writes me, July 29, 1922: "As regards the distribution of the White Fox in James Bay: they are quite uncommon around both Moose Factory and Albany, and only a few stray ones are caught every season so far south; as one pro-

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[15] 3 Years, II, p. 368.

[16] F. B. A., I, p. 87.

[17] MacFarlane: Mackenzie Basin, 1908, p. 197.

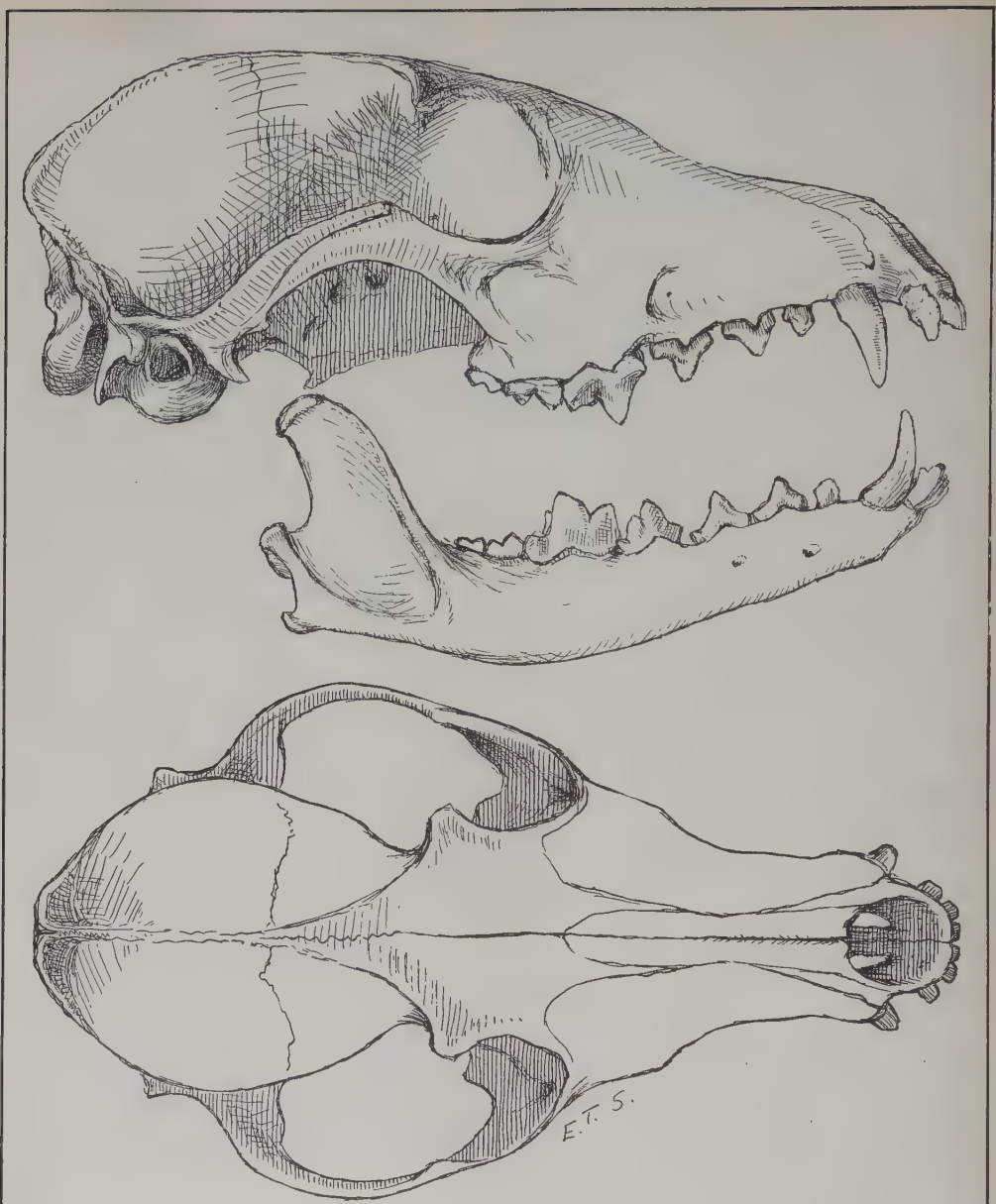
[18] N. A. F., 24, p. 40.

[19] Mammals, etc., Mackenzie River District, Can. Nat. & Geol., 1862, Art. XIII, p. 138.

[20] Preble: Mamm. of Keewatin, N. A. F., 27, pp. 217–18.

[21] As above, p. 63.

[22] Bangs: Mamm. Lab., Am. Nat., 1898, p. 504.



Genus Alopex.

Plate LXXXI. Skull of Arctic Fox ♂ (innuitus) ½
Mackenzie Delta. American Museum 31335

ceeds farther north, they become more numerous on both sides of the Bay, and large numbers are killed at Great Whale River on the east coast and Opinaga on the west coast."

The Newfoundland record "Occasional" was sent me by J. P. Howley, Director of the Museum at St. John's, Newfoundland; similar testimony is offered by Bachman.[23]

"Occasionally seen in Labrador, Newfoundland, and on two occasions, on Anticosti, which island it reached probably on ice."[24]

J. L. DeVany sends the following to the *Canadian Field Naturalist*, for Sept., 1923, p. 118. This is the southmost record.

"A White or Arctic Fox was shot at Lingan Bay on the east coast of Cape Breton Island on April 10, 1923, by William Ferrow and Neil Boutelier, residents of that district. . . .

"In the spring of 1922, there was a notable migration of White Foxes from the north to the southern coast of Labrador."

Haunts

The chosen surroundings of the White Fox in summer are open plains or rocky hillsides indifferently, so long as they are not in thick woods or in swampy grounds. The wilder and more rugged the country, the nearer to its taste; and its ideal home is apparently among rocky, precipitous cliffs, especially along the coast, for here it finds in summer the nesting places of the birds, and all the year such sheltering nooks and caves as best serve it for home or storehouse.

It makes, however, a marked change in the winter. Stefansson writes that the White Fox is almost as much of a sea animal as the Polar Bear, for probably 90 per cent. of White Foxes spend their winters on the ice.[25]

Amazing Numbers

From all parts of its 5,000,000 square-mile range the White Fox is reported as abundant. No Arctic explorer yet has failed to find it when on land; and, with the possible exceptions of the Caribou and the Polar Hare, it seems to be the most plentiful of all the large animals. To give a concrete idea of its abundance is possible in certain localities only. Thus at Port Kennedy, about 72° N. lat., north point of Boothia Felix, where Capt. F. L. McClintock wintered and spent 11 months in 1858–59, his game list was 2 Bears, 8 Caribou, 9 Hares, 19 Foxes, 82 ptarmigan, 98 wildfowl, 18

[23] Q. N. A., III, p. 96.

[24] Wm. Couper: Notes on Mammals of Canada, Forest & Stream, June 14, 1877, p. 300.

[25] Friendly Arctic, p. 155.

Seals, as well as several Ermines and Lemmings.[26] From which we may argue the Fox to be the most abundant of the larger animals.

At Winter Island (about lat. 66°, long. 84°), in the winter of 1821–22, Capt. George F. Lyon captured between 80 and 90 Foxes, more than 70 of which were taken before the end of December. On the night of Nov. 25th, he caught 15 in 4 hours with a single barrel-trap.[27]

A similar game list made by MacDougall at Dealy's Island, south shore of Melville Island, from September 3, 1852, to September 9, 1853, is equally illustrative. It runs: Muskoxen, 114; Reindeer, 95; Hares, 146; Bears, 6; Wolves, 3; Foxes, 51.[28]

Greely says: "In 1883–84, we killed 25 Foxes."[29]

According to the Can. Govt. Report on Muskox and Reindeer, 1922, (p. 74), 2,000 White Foxes were collected by traders on Kent Peninsula during the winter of 1919–20. Evidently this place is on the migration route between Victoria Island and the mainland.

At Ungava, says Dillon Wallace, an average hunter will take from 50 to 70 Foxes in a season, though one or two exceptional trappers have captured as many as 200.[30]

The Hudson's Bay Company men tell me that at Fort George one man killed 450 Foxes in one winter, and others even more.

"While cruising along the coast between Bering Straits and Point Barrow, during the summer of 1881, hundreds of their skins were brought off to us by the Eskimo; they were found in equal numbers along the opposite Siberian coast."[31]

Hearne says: "I have known that for 3 years running, not less than from 200 to 400 have been caught each year within 30 miles of the Fort [Churchill]. . . . I have frequently known near 40 killed in one night, within half a mile of Prince of Wales's Fort [during the migration], but this seldom happens after the first or second night. . . . In some years [they] assemble in considerable numbers at York Fort and Severn River."[32]

In Greenland, 1,500 Foxes are killed yearly. The greatest number was 5,000 in 1874. About half of these are caught between latitudes 60 and 61, on

[26] Voyage of the Fox, p. 299.

[27] Parry's Second Voyage, p. 151.

[28] Voy. Resolute, p. 529.

[29] 3 Years, II, p. 368.

[30] Long Labrador Trail, 1907, p. 236.

[31] Nelson: Nat. Hist., Alaska, p. 239.

[32] Journey, pp. 363–64.

the coast, for of course there are none on the great glacier which covers all but the rim of Greenland.[33]

The sales of the Hudson's Bay Company are usually a fair index of the abundance of fur-bearing animals; in this case, they probably fail because the skin of the White Fox was until lately of low value. In the period between 1853 and 1877, they averaged marketing near 5,000 skins each year. The great years were 1856, 1864, and 1869, which showed respectively, 10,311, 12,242, and 12,088. The lean years were 1855, 1859, and 1871, showing respectively, 1,897, 1,577, 1,805 skins.[34]

It must be remembered, of course, that a skin is sold the year after it is taken, and that probably not half of those captured by the natives were marketed.

During the great fur harvest, 1921–22, according to the Canadian Government official report on "Fur Production in Canada, 1923," 40,927 White Fox pelts were taken in Canada.

In 1922–23, the Northwest Territories and Yukon yielded 26,047 White Fox pelts.[35]

In the spring, the Arctic Fox is subject, at times, to a curious disfigurement. When the sun is hot, the ice often becomes covered with a thin film of water, and when a Fox sits down in this, the water in his shadow being protected from the sun, quickly freezes. Thus when he decides to depart, his hair is frozen to the ice; and freeing himself with a wrench, he leaves behind the tips of many long hairs. A few experiences of this sort ruin the posterior part of his coat.

The Great Trek

The summer range of the White Fox includes all the *land* within the dark area on the map; so does the winter range, but the latter also includes the frozen *sea*. And further, this creature makes annually a nation-wide migration or rather emigration, that is a close parallel to that of the Gray-squirrel and is due to the same impulse, namely, the overcrowding of the breeding grounds in the North, which necessitates a search for food farther afield.

The history of this movement seems to be much as follows: Fox pairs have each their own home range, their exclusive summer hunting ground. From this they do not wander far, and for it they will fight to the death against any intruding Fox or Foxes. It is just enough for them and no

[33] Dan. Green., pp. 104–05.

[34] Mamm. N. Can., p. 200.

[35] Natural Resources Canada, April, 1924, p. 3.

more, so that, in autumn, when the numerous young are full grown, the range becomes overcrowded. Then the family tie begins to weaken, the parental love fails, and finally the cubs are told in some convincing way that they must now strike out and face the world for themselves. So with lusty bodies and such wisdom as their parents have been able to impart in 5 or 6 short months, they set out to seek their fortunes, just like millions of younger sons in our own walk of life.

From far-off lat. 83°, 24′ to their south line, and from Point Barrow to Disko, the impulse to go is born apparently in every junior Fox. But what is it that dictates the direction? We cannot tell. It may be the north wind, it may be the shape of the land, or the movements of Caribou or ptarmigan, that is, the possibilities of food; or it may be magnetic currents. No one knows.

In some migrant birds we find that the old ones who know the road are the guides that lead the way. But in the case of the young Fox this is quite out of the question, for none of those who make the journey ever did it before, or will ever do it again. The impulse is blind and deep-laid, like that which leads the Gray-squirrel, the Lemming of Norway, the Caribou of America, and the Springbok of Africa, and—one time—led the Teuton hordes of Central Europe, always on a southward route.

The parallelism of the movement with that of the Gray-squirrels and Lemmings is further evidenced by the fact that it is not at all regular.

As to the exact time of the migration, observers differ. Some make it mid-autumn and some mid-winter; which discrepancy doubtless means that it takes place at different times in different regions, and varies in different years, depending, no doubt, on stress of weather and dearth of food.

Richardson says: "Toward the middle of winter they retire to the southward, evidently in search of food, keeping as much as possible on the coast, and going much farther to the southward in districts where the coast line is in the direction of their march."[36]

Captain Parry relates that the Arctic Foxes, which were previously numerous, began to retire from Melville Peninsula in November, and that by January, few or none remained.[37]

Hearne, who was the first to describe the movement, says: "The Arctic Foxes are in some years remarkably plentiful, but generally most so on the Barren-ground, near the seacoast. Notwithstanding what has been said of this animal only visiting the settlements once in 5 or 7 years, I can affirm that there is not one year in 20 that they are not caught in greater or

[36] F. B. A., I, p. 87.

[37] 2nd Voy., p. 387.

less numbers at Churchill. . . . They always come from the north along the coast, and generally make their appearance at Churchill about the middle of October, but their skins are seldom in season till November; during that time they are never molested, but permitted to feed around the Fort, till by degrees they become almost domestic. The great numbers of those animals that visit Churchill River in some years do not all come in a body, as it would be impossible for the fourth part of them to find subsistence by the way; but when they come near the Fort, the carcasses of dead Whales lying along the shores, and the skin and other offal after boiling the oil, afford them a plentiful repast, and prove the means of keeping them about the Fort till, by frequent reinforcements from the northward, their numbers are so far increased as almost to exceed credibility.

"When their skins are in season, a number of traps and guns are set, and the greatest part of them are caught in one month, though some few are found during the whole winter. . . . When Churchill River is frozen over near the mouth, the greatest part of the surviving White Foxes cross the river, and direct their course to the southward, and in some years assemble in considerable numbers at York Fort and Severn River."[38]

And still on southward, drifting in ever-dwindling waves till the last concentration along the two shores of the Bay, lands a scattering remnant to peter out at Moose Factory, the southmost point of their region, the last south outpost of their great Lone Land.

"In like manner they extend their migrations along the whole Labrador coast to the Gulf of St. Lawrence. Most of those which travel far to the southward are destroyed by rapacious animals; and the few which survive to the spring breed in their new quarters instead of returning to the north. The colonies they found are, however, soon extirpated by their numerous enemies. A few breed at Churchill, and some young ones are occasionally seen in the vicinity of York Factory."[39]

Whether they all are killed, or what becomes of those which escape, is very uncertain; but "it is well known that none of them ever migrate again to the northward."[40]

Thus ends the great and periodic, but not quite annual, emigration of the White Fox. The movement is not a true migration, for it is not regular and there is no return movement. It is merely the forcing out of the surplus population, which goes into a far country to be destroyed by the dangers of a new and unaccustomed environment.

[38] Journey, pp. 363–64.

[39] F. B. A., I, p. 88.

[40] Hearne: Journey, p. 364.

His Broad Views on Diet

The White Fox is a Fox; therefore, his dream of alimentary bliss is chicken; chicken of any kind, web-foot or split-foot, and of any age, old or young, fresh and hot, or dead and putrid, feathered and flying, new-hatched or fluid on the half-shell.

During the bright beautiful summers of the Polar Isles the Fox is ashore feasting on birds and Lemmings, principally the latter. But winter with deep snow makes a change. The hardy adventurous Foxes are driven to sea, and there they find a staple food supply in the little auks or dovekies that fly or swim or spot the ice floes still; for they are there not only through all the short bright summer, but a part of dreary winter too.

On Feb. 1, 1858, Captain McClintock found a Sooty-fox on a floe 130 miles from the nearest land. But it was very fat and seemed happy, "hence we argue dovekies were much more numerous during winter than we supposed."[41]

The nesting time for birds is, of course, a time of carnival for the Foxes. During that, they eat, drink, make very, very merry, and multiply. Each realm of life at this season contributes to their feasting. Captain McClintock writes:

"2nd July, 1859,—Yesterday, one of the men brought on board a trout weighing 2 lbs.; he saw a glaucous gull and a Fox disputing for it; the former seems to have killed and brought it to land."[42]

In Attu, an island of the Aleutian Chain, off the southwest coast of Alaska, Turner says the ptarmigan "frequent the higher elevations, probably on account of the great number of Foxes (*Vulpes lagopus* Baird), which occur on that island, and have but little to subsist on. The natives of Attu assert that this same species of ptarmigan occurs on Agattu Island, and that it is quite numerous there, probably on account of the absence of Foxes."[43]

But birds are the Fox's dainties. His stock food is probably the Lemming, that curious little bobtailed Snow-mouse which is found in one form or another, summer and winter, on every stretch of land throughout the whole realm of the White Fox, and whose sole job in life seems to be gathering and grinding up grass, moss, and lichen in his wonderful little body, and transmuting these into the higher terms of flesh and blood, for the helping of his betters, whose chemic powers are less than his; and which

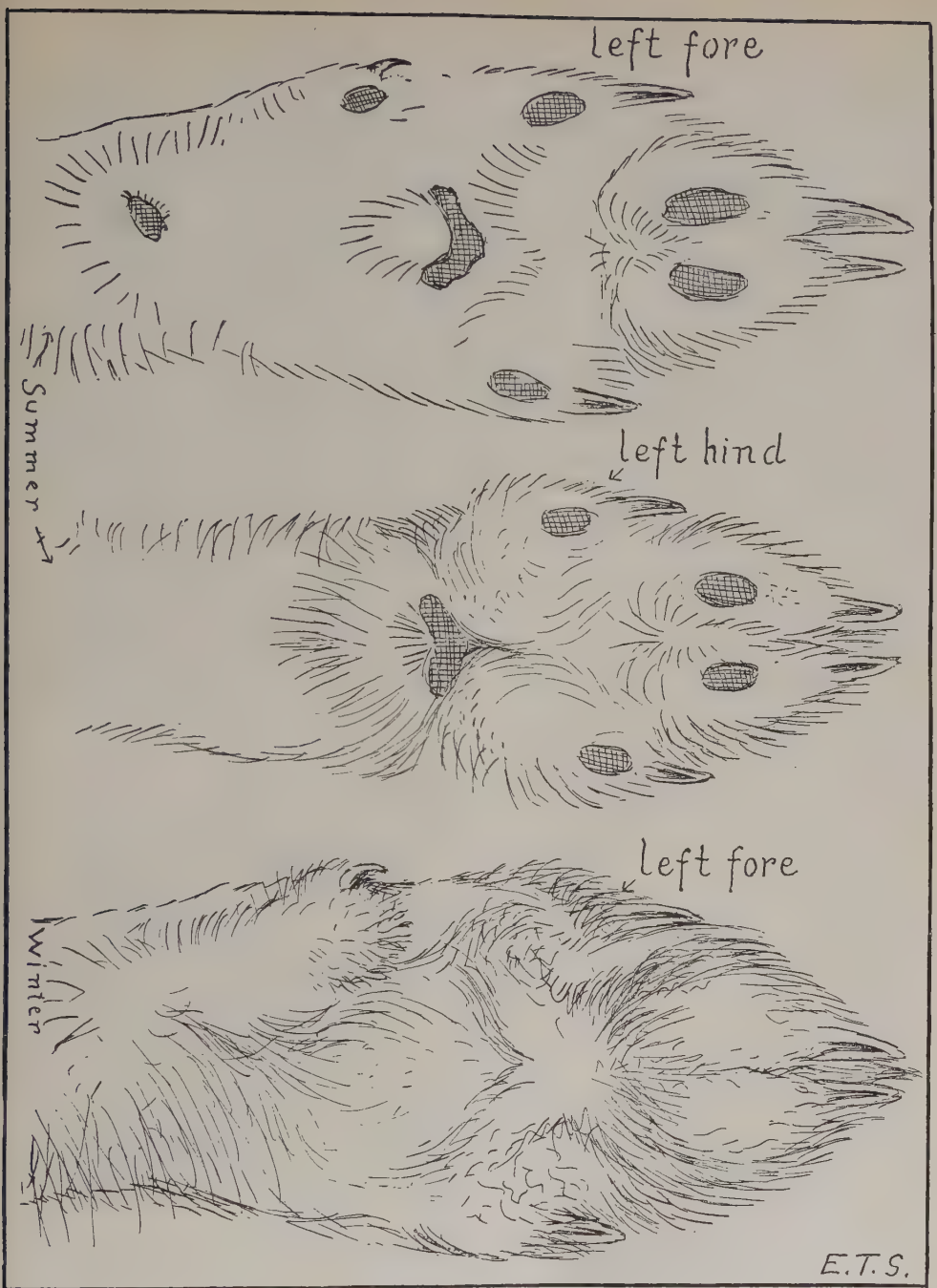
[41] Voy. Fox, pp. 79–80.

[42] As above, p. 292.

[43] Contrib. Nat. Hist. Alaska, p. 156.

PLATE LXXX.—ARCTIC FOX IN EARLY WINTER
By E. T. Seton
From drawing loaned by New York Zoological Society

PLATE LXXXIV.—ARCTIC FOX IN GRAY COAT
From photograph taken by Elwin R. Sanborn in New York Zoological Park



Plate, LXXXII., Soles of Arctic Fox - from dry skins. 1/1.

Lemming teems so prodigiously that it makes the proverbially prolific Guinea pig kind look like dying remnants of a species that is overwhelming itself with race suicide. The Lemming, then, is the staple food of the White Fox, for it is with him the year round. But he has at least 100 and "57 varieties" on his list, for his definition of food is: "Anything that smells in the least like grease." So exactly does he apply this religious dogma that Armstrong found a Fox whose stomach was distended with the hair and a portion of the hoof of a Caribou.[44] In the stomach of another he found small pieces of dwarf willow. Maybe it had got greased in some way, for so far no one else has noted their feeding on grass, leaves, or even fruit.

A still more reckless application of the grease-smell test is supplied by Nelson, who says: "Near the entrance of one of these burrows, I inadvertently left a notebook, and when I returned for it an hour later, it had disappeared, having been confiscated, no doubt, by the occupant of the hole."[45]

Ivan Petroff, in his 1883 report, says: "They may be called omnivorous, and they refuse nothing that will fill their stomachs. I observed one sleek and apparently well-fed specimen which devoured nearly the whole of a large salmon, and afterward worried down, with considerable difficulty, a thick leather strap with a heavy buckle attached to it. In the depth of winter, the natives find it unsafe to leave any article of clothing, Dog harness, or boat material within their reach."[46]

"As a proof of what Foxes will eat to satisfy hunger," says Captain Lyon, "I may mention having examined the stomach of one which contained a mass of rope yarns and line, of the size of the doubled fist; amongst which some pieces of sinnet or plaited stuff were above 6 inches in length!"[47]

"On the hillside to the west of the Lagoon [St. Paul Island] and over toward Lukanin, I frequently heard the harsh bark of the Fox proceeding from among the piles of rock, and here and there the little brown head of a cub would appear at the mouth of a burrow. All about these burrows were scattered fragments of sea-birds' bones, of skulls and limbs of Fur-seal pups, and other similar relics of repasts. Once I observed a Fox trotting along toward its burrow with a fresh Fur-seal placenta in its mouth, and Foxes may be frequently seen on the outskirts of the rookeries hunting for placentas.

"During the summer all these articles, as well as birds' eggs, are eaten

[44] Disc. N. W. Pass., 1857, p. 304.

[45] Nat. Hist. Alaska, p. 240.

[46] Fur Seals, pt. III, p. 339.

[47] Priv. Journ., p. 78.

by the Foxes, but in winter they lead a somewhat precarious existence and subsist largely on sea urchins (*Strongylocentrotus drobachiensis*), which they obtain at low water. During the fall of 1896, the Foxes devoured all the Seal pups which had perished of starvation caused by pelagic sealing.

"The fields all over the islands are traversed by Fox trails, and many lead up and down across the face of the precipitous cliffs that bound the islands at different points."[48]

"During summer they fare sumptuously upon the breeding waterfowl, eggs, and young birds which are found everywhere, but in winter comes harder work and the ground is carefully searched for stray Mice, Lemmings, or an occasional ptarmigan. In early spring, toward the end of March, when the Seals begin to haul up on the ice and the first young are born, thousands of these Foxes go out seaward and live upon the ice the rest of the season. The young Seal's offal, left by the hunters and from other sources, gives them more food there than the shore affords at this time.

"At this season I have travelled along the coast and seen scores of their tracks leading seaward, and not one directed toward the land. In fall, a dead Whale or other large sea animal cast ashore forms a general feast for all the Foxes and ravens from the country around until its bones are polished."[49]

When in winter this happy-go-lucky little Snow-dog has the rare good luck to secure a big fat Arctic Hare, nearly as heavy as himself, his fortune is made for a week at least.

Henry W. Elliott's picture of bird and Fox life on a rugged sea island is well worth reproducing:

"Walrus Island is the most favourable spot in this whole Alaskan country to observe the nesting and breeding birds of Bering Sea. It is a low lava rock, 7 miles to the eastward of Northeast Point, with an area of less than 5 acres, rugged and bare of all vegetation, save a species of close-growing curly grass. Here the *Lomvia arra* and many gulls, cormorants, sea-parrots, and auks come to lay their eggs in countless numbers. The face and brow of the low, cliff-like sea-front are occupied almost exclusively by the 'arries' (*Lomvia arra*), which lay a single egg each on the surface of the bare rock, and stand straddling over it while hatching, only leaving at irregular and short intervals to feed. Hundreds of thousands of these birds alone are thus engaged about the 29th of June on this little island, standing stacked up together like so many bottles, as thickly as they can be stowed, making all the time a deep, low, hoarse, grunting noise. They quarrel

[48] F. W. True, Mamm. Prib. Fur Seals, pt. III, p. 349.

[49] Nat. Hist. Alaska, pp. 239–40.

among themselves incessantly, and in this way roll thousands of eggs off into the sea, or into crevices and fissures, where they are lost and broken."[50]

Now this pioneer naturalist goes on to tell us that the shell of the arrie's egg is of such remarkable strength, that it will stand rough handling that would in a moment destroy ordinary eggs; and that the natives tumble the egg crop about as they would apples. From this, one may infer that many of the tumbled eggs lodge more or less whole in crannies of the rock, or, falling into the sea, are washed ashore intact. Then he adds:

"I have, time after time, been struck by the wonderful temerity of the Foxes (on St. George's Island especially) while secretly watching them as they were climbing up and down the faces of almost inaccessible cliffs, seeking eggs. They go on a full run or a stealthy tread over the brows of the cliffs that fairly overhang the sea 600 and 900 feet below. They always bring the eggs up in their mouths, and carry them back from the brink of the precipice, where they leisurely suck them, usually biting the shell out at the larger end. The 'arrie' suffers the most from these enemies, which are the only natural foes that the bird-kind has to contend with on these solitary islands."[51]

It is a remarkable fact that no one yet has recorded the White Fox feeding on the crowberries (*Empetrum nigrum*), the manna of the Northern desert, a mainstay of most other creatures in the region.

His Parasitic Food Habit

Many Arctic travellers have pointed out a quaint and natural parasitism on the part of the Fox that reminds us of the Jackal and the Lion, or the Coyote and the Cougar. Dr. E. K. Kane was the first to set it forth at length. He relates it as follows:

"There are fables about the relation between these two animals [Fox and Bear] which I once thought my observations had confirmed. They are very often found together: the Bear striding on ahead with his prey; the Fox behind, gathering in the crumbs as they fall; and I have often seen the parasite licking at the traces of a wounded Seal which his champion had borne off over the snow. The story is that the two hunt in couples. I doubt this now, though it is certain that the inferior animal rejoices in his association with the superior, at least for the profits, if not the sympathy it brings to him. I once wounded a Bear when I was out with Morton during our former voyage, and followed him for 12 miles over the ice. A miserable little Fox travelled close behind his patron and licked up

[50] Report upon the Condition of Affairs in the Territory of Alaska, 1875, pp. 170–71.

[51] As above, p. 172.

the blood wherever he lay down. The Bear at last made the water; and, as we returned from our fruitless chase, we saw the Fox running at full speed along the edge of the thin ice, as if to rejoin him."[52]

McClintock, too, observed this foxy trick. He says: "We have often noticed the tracks of Foxes, following up those of the Bears, probably for discarded scraps of the Seals upon which they prey."[53]

Greely had a glimpse of this arrangement, for he says at Greely Fiord in Grinnell Land, May 12, 1882, he "crossed the tracks of a Bear, going up the fiord, evidently followed by a Fox."[54]

And Stefansson gives us other details. After mentioning that in winter the Foxes take to the sea ice, he says:

"They are not able at sea to provide their own living, so several will be found following a Bear wherever he goes. When the Bear kills a Seal, he eats all he wants, usually from a quarter to half of the carcass. In many cases, he touches none of the meat, but eats merely a portion of the blubber and the skin that goes with it. After this satiating meal, he probably feels as if he will never care to eat again, and goes away to sleep under a neighbouring hummock, leaving for the Foxes what is left. It is not likely that he will come back, but if he did, the Foxes would hop and the gulls flutter away. From long experience, he gets the impression that these creatures are not the least bit dangerous, but too elusive to be caught."[55]

An interesting chapter on the food tastes of a captive Snow-dog is offered by Dr. E. K. Kane, as follows:

"If I was asked what, after darkness and cold and scurvy, are the three besetting curses of our Arctic sojourn, I should say *Rats*, *Rats*, *Rats*. A mother Rat bit my finger to the bone last Friday, as I was intruding my hand into a Bearskin mitten which she had chosen as a homestead for her little family."

A Dog was secured to combat the Rats in the cabin, but was driven off "yelping and vanquished." Bows and arrows were freely used, and Dr. Kane himself, not the men, learned to eat the fresh Rats as a helpful addition to the salty meat fare—a variant which he considers explained his "comparative immunity from scurvy." He says: "I had only one competitor in the dispensation of this *entremet*, or rather one companion; for there was an abundance for both. It was a Fox: we caught and domesticated him late in the winter; but the scantiness of our resources . . . and,

[52] Arc. Expl., I, p. 400.

[53] Voy. Fox, p. 80.

[54] 3 Years, II, p. 36.

[55] Friendly Arctic, pp. 155–56.

of course, his own, soon instructed him in all the antipathies of a terrier. He had only one fault as a rat-catcher: he would never catch a second till he had eaten the first."[56]

An admirable attitude, indeed. That Fox was a true sportsman, a sportsman who stops when he has all he can use, in contrast to the game-hog who kills, kills, kills, for the pleasure of killing.

This general observation may be made: Many a Polar traveller has killed Foxes and found their bellies absolutely empty, but no one yet has recorded a case of a White Fox starved to death or even near it.

There is, however, a dark chapter that must usually be written for flesh-eating animals under stress of famine. They become cannibals. That chapter must be entered here.

Hearne says: "These animals will prey on each other as readily as any other animals they find dead in a trap, or wounded by gun; which renders them so destructive, that I have known upward of 120 Foxes of different colours eaten, and destroyed in their traps by their comrades in the course of one winter, within half a mile of the Fort."[57]

His Frugal Mind and Forethought

Reference to the article on the Red-fox will show that that species has a well-developed storage habit. It is probable, indeed, that every land quadruped which winters in the North and does not go into a winter-sleep or torpor, lays up a store of food in some shape or form.

The Caribou, the most striking apparent exception, lays up its store in the form of the "backfat" or hump, fully discussed in the chapter that belongs; but the White Fox is conspicuous for the method and number of his stores laid by for winter.

Richardson says: "On one occasion during our late coasting voyage round the northern extremity of America, after cooking our supper on a sandy beach, we had retired to repose in the boats, anchored near the shore, when 2 Sooty Foxes came to the spot where the fire had been made, and carrying off all the scraps of meat that were left there, buried them in the sand above high-water mark. We observed that they hid every piece in a separate place, and that they carried the largest pieces farthest off."[58]

Captain Lyon says of those he held captive on Melville Peninsula: "Their first impulse on receiving food is to hide it as soon as possible, even

[56] Arc. Expl., I, pp. 394–95.

[57] Journey, pp. 364–65.

[58] F. B. A., I, p. 90.

White for Winter Coat 1886
Plate Lxxxiv Studies of Arctic Fox by E.T. Seton
Summer Coat
Autumn Coat
Crowberry
from live sp
Aylmer Lake 18 Aug 1907
summer coat

though suffering from hunger, and having no fellow prisoners of whose honesty they are doubtful. In this case snow is of great assistance, as being easily piled over their stores, and then forcibly pressed down by the nose. I frequently observed my Dog-fox, when no snow was obtainable, gather his chain into his mouth, and in that manner carefully coil it so as to hide the meat. On moving away, satisfied with his operations, he of course has drawn it after him again, and sometimes with great patience repeated his labours 5 or 6 times, until in a passion he had been constrained to eat his food without its having been rendered luscious by previous concealment."[59]

Captain McClintock, after pointing out the scarcity of food during the 8 months of each year in Fox country, suggests that they store up food, and adds that his interpreter Carl Petersen, from Greenland, "thinks they store up provisions during the summer, in various holes and crevices, and thus manage to eke out an existence during the dark winter season; he once saw a Fox carry off eggs in his mouth from an eider-duck's nest, one at a time, until the whole were removed; and in winter he has observed a Fox scratch a hole down through very deep snow, to a cache of eggs beneath."[60]

At the fox-farm of E. Norton, Dover, Me., I learned in 1905 that the Blue-foxes invariably bury surplus food, then squat over the place to mark it, either with urine or dung. They dig it up and enjoy it as soon as hungry, but like it the better if it has had time to ripen a little.

Greely says of his two captives: "Whenever they received food, they endeavoured to conceal it, never eating it at once."[61]

But the most complete and convincing evidence comes to us from Grinnell Land, as follows:

During the Nares expedition to northern Greenland in 1875–76, Col. H. W. Feilden made some interesting observations on this Fox's habit of forming caches. On July 13, 1867, having shot a Fox in Grinnell Land, he sat down to rest near a patch of plants, when, he says, "many Lemmings popped up from their holes, and undismayed by our presence, commenced feeding on the plants. We noticed that numerous dead Lemmings were scattered about. In every case, these had been killed in the same manner —the sharp canine teeth of the Foxes had penetrated the brain. Presently, we came upon two Ermines, killed in the same manner. . . . Then, to our surprise, we discovered numerous deposits of dead Lemmings. In one hidden nook under a rock we pulled out a heap of over 50. We disturbed numerous 'caches' of 20 and 30, and the ground was honey-combed

[59] Priv. Journ., pp. 75–76.

[60] Voy. Fox, p. 70.

[61] 3 Years, II, p. 367.

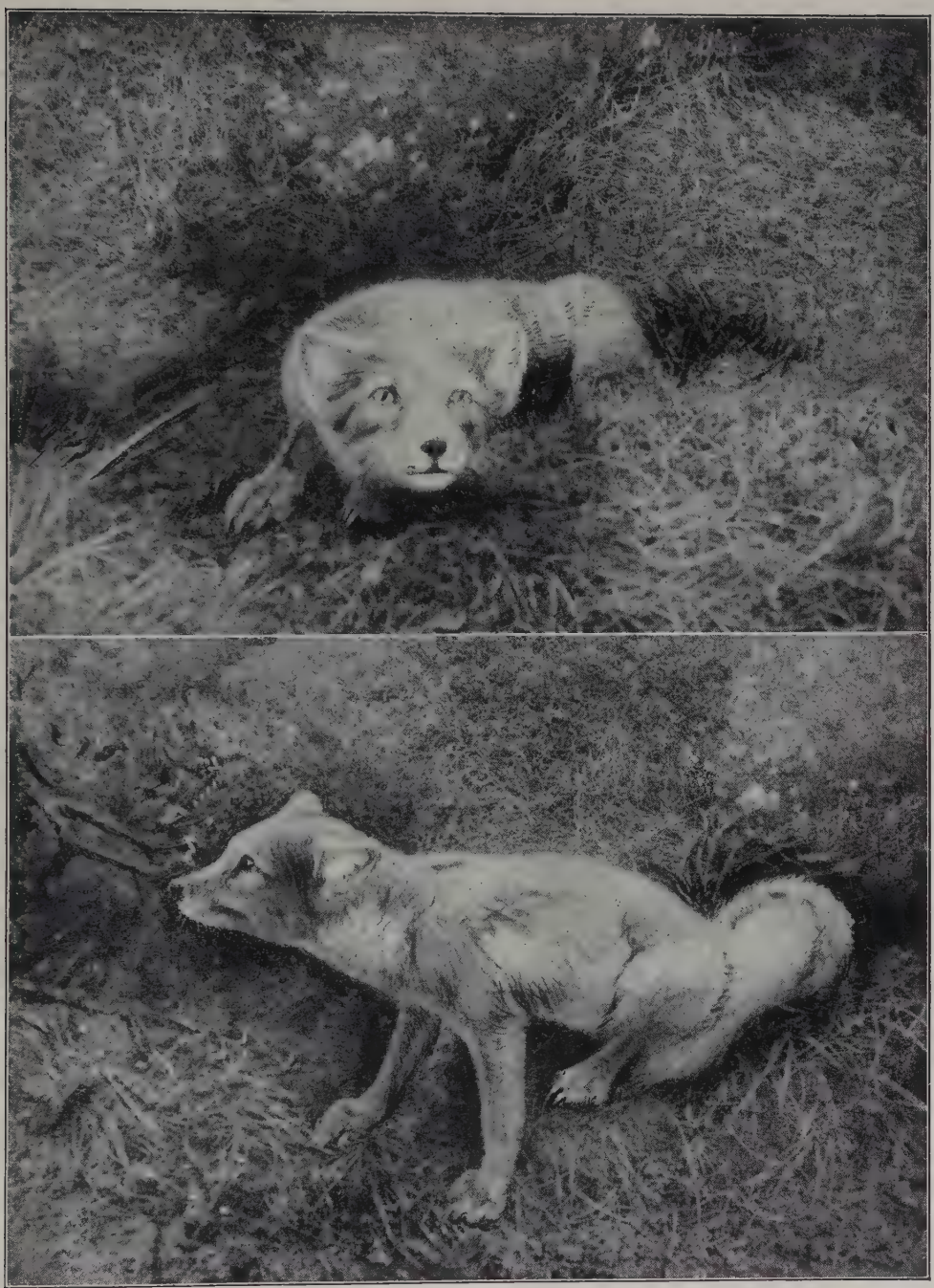


PLATE LXXXV.—ARCTIC FOX IN SUMMER COAT
Taken at Aylmer Lake, N. W. T., by E. T. Seton, Aug. 18, 1907
The luxuriant herbage of the Arctic region shows to advantage

PLATE LXXXVI.—PHOTOGRAPHS OF RED FOXES
By E. T. Seton

with holes, each of which contained several bodies of these little animals, a small quantity of earth being placed over them. In one hole we found the greater part of a Hare hidden away. The wings of young brent geese were also lying about."[62]

There is, therefore, a great volume of evidence to show that all summer long, during the time of plenty, this wise little Fox lays up treasures for himself deep in the earth; and not very deep must he go in order to lay his Lemming tidbits on ice, and thus in cold storage. There is, of course, always a chance of the cache being robbed by hostiles, but each Fox makes, no doubt, many caches and marks each with his own mark, the odour of his protometric gland,[63] so that he can come again infallibly to the place in a time of need. There is every reason to believe that these summer-made stores are the secret of his safely living through the time of frost and starvation.

But (and this is a cardinal *but*), there is a good deal of evidence to show that these caches are made by the old Foxes only, and for their own exclusive use. The young ones make no cache, for they are not fending for themselves until late September. Then they are possessed of a roving spirit that prevents them from having a fixed abode or centring interest in one place, so that the provident instinct does not develop. When the winter comes, they have to find another means of subsistence; which they seek elsewhere, as already stated.

His Thirst

There is one necessary of life that the happy White Fox can always count on getting in abundance, and that is drink. "Snow is the substitute for water to these creatures," says Captain Lyon, "and on a large lump being given them, they break it in pieces with their feet, and roll on it with great delight. When the snow was slightly scattered on the decks, they did not lick it up as Dogs are accustomed to do, but by repeatedly pressing with their nose, collected small lumps at its extremity, and then drew it into the mouth with the assistance of the tongue."[64]

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[62] Nares: Narr. Voy. Polar Sea, 1875–76 (pub. 1878), II, Appendix, pp. 193–94.

[63] The protometra or protometric gland is, according to Chauveau (p. 969, English version), a small pouch present in all domestic animals, and sometimes double, which secretes a fluid that is thrown into the urethra through a very small orifice near the *Verumontanum*.

George Fleming, the English editor, adds to this, that the gland is not a gland in the ordinary sense of the term, but is certainly the rudiment of the duct that develops into the uterus of the female. It is also called the *prostatic utricle* or *sinus pocularis*.

[64] Priv. Journ., p. 76.

His Personal Cleanliness

Cats are usually more careful than Dogs in matters sanitary, but this little Snow-dog is most exemplary. Captain Lyon, after daily study of their habits during the two dreary winters he passed on Melville Peninsula, wrote:

"The Arctic Fox is an extremely cleanly animal, being very careful not to dirt those places in which he eats or sleeps. No unpleasant smell is to be perceived, even in a male, which is a remarkable circumstance."[65]

Swimming

When one reads of this Fox's normal life among sea-birds, climbing cliffs, where a misstep would end in a deep sea plunge, or on floating ice within two steps of an involuntary bath, and among animals and birds whose whole life is in and about the sea, one is surprised to learn that the White Fox never voluntarily enters the water or attempts to swim. There can be no doubt that when the Fox actually tumbles in, it can swim out, for all four-footed animals swim instinctively. The reason for this is obviously that the same movements that propel them on land also propel them in water, so that they do not need to learn to swim. But, with one partial exception, no one yet has made record of a White Fox swimming voluntarily as do its southern relatives. The exceptional remark is by Dr. E. K. Kane. He says: "It is a mistake to suppose he cannot swim; he does, and that boldly."[66]

It is worthy of note here that neither Eskimo nor northern Indian can swim. When either falls into the water, he must be rescued or he will drown. For Fox, Eskimo, and Indian, the reason is much the same. The water is so deadly cold that human beings have no inducement to learn, while the Fox has no waterproof fur to keep him warm; therefore, all alike shun the icy flood.

Tracks

"During my long winter journeys along the coast of Bering Sea," says Nelson, "the tracks of these Foxes were found everywhere; they were distinguishable from those of the Red-fox by their smaller size."[67] (See Plate CXVII.)

Service to Man as Food

The most obvious use of the White Fox to man is as a fur-bearer, but in its native region, it is considered a first-class game animal and the source of a most acceptable supply of delicious food.

[65] Priv. Journ., pp. 74–75.

[66] Arc. Expl., I, p. 400.

[67] Nat. Hist. Alaska, p. 239.

Hearne, who had every reason to know, says:

"White Foxes, when killed at any considerable distance from the sea coast (where they cannot possibly get anything to prey upon, except Rabbits, Mice, and partridges), are far from being disagreeable eating. And on Marble Island, I have shot them when they were equal in flavour to a Rabbit; probably owing to their feeding entirely on eggs and young birds; but near Churchill River they are as rank as train-oil."[68]

Many Polar explorers testify to the excellence of this Fox's flesh. Doubtless as a variant to vile, poisonous, scurvy-causing salted beef, most anything would seem delicious.

And Capt. G. F. Lyon says: "Their flesh, indeed, had so good an appearance, that many trials were made of it. All were horrified at the idea of eating Foxes, but very many soon got the better of their delicacy, and found them good eating. Not being myself very nice, I soon made the experiment, and found the flesh much resembling that of kid, and afterward frequently had a supper of it."[69]

Fur

Summer furs of land animals are, of course, thin, harsh, and worthless. In the case of the Arctic Fox, the summer coat is still worn as late as September; but, by November, provided the animal is healthy, his fur is in prime condition and of a spotless white. At the same time, the coat of the Blue-fox acquires its softest blue-gray tint. In the case of both, the fur remains at its best till late in March.

Nevertheless, there is a very wide difference in the respective market values of the two. Other things being equal, the pure white fur is of lowest value. Blue pelts from the mainland are worth 3 times as much as the white, and the blue from the islands of the Bering Sea are worth 3 or 4 times as much as those of the mainland, the fur from the islands being, for some reason, darker, finer, and fuller than that of their kinsman on the mainland. The fur is best in the first and second years as is the case with most animals.

These island Foxes are now regularly ranched, fed, and protected as well as bred for quality, but that is a matter fully treated in another chapter.

During the last 10 years (1913–22) 5,982 pelts of Blue-foxes have been marketed from the Pribilofs. At one time $5 each was considered a fair price for Blue-foxes and $1 for White ones, but now they are much dearer.

[68] Journey, pp. 365–66.

[69] Priv. Journ., p. 64.

Preble says that "665 Blue-foxes sold at St. Louis, Sept. 10, 1919, brought an average price of $195.90. On Feb. 21, 1921, 901 Blue-foxes brought an average of $88.12, and 37 White Foxes brought $35 per skin. On Sept. 28, 1921, 1,125 Blue-foxes were sold at an average price of $96.83."[70]

His Home Range in Summer

Each individual animal has, of course, a home range or territory that he considers home and for which he will fight. This property instinct is especially marked in those animals whose food supply is limited, such as hunters or harvesters; and it is doubly marked when they are of a kind that belongs to both groups. The reasons for this are obvious: it is a necessary outcome of the law of self-preservation.

The Arctic Fox has advanced far along these lines. Dr. F. W. True, while investigating on the Blue-foxes of Pribilof Islands, was followed frequently by these curious and semi-tame creatures, and on one occasion, pelted the Fox with pebbles to drive it back, but in vain.

"As I proceeded," he says, "the Fox drew near again, and followed me to the boundary of his domain, for each Fox, like his neighbour, the bull Seal, seemed to have a definite territory which he regarded as his own, and upon which he resented intrusion."[71] How large this domain is, True does not tell.

And now we come to a problem. We have seen that the White Fox lays up stores of food for the winter. These stores are, of course, on his home range. If he moves out on his great migration, he must leave his stores behind, and if he has stores, he has no need to go out.

Doubtless, the solution is that the old Foxes who have stores remain and the young ones, having none, move out. If an old one joins the Great Trek in search of food, it probably means that he had no chance to make a cache or else his cache was robbed. If a young one remains—and some must—it means that he was lucky in finding a food supply.

Mating, Breeding, and Dens

There is abundance of evidence, and quite conclusive, that the White Foxes pair and are strictly monogamous. There is some evidence, mostly collateral, that they pair for life.

During the month of March, the mating is consummated, and gestation continues for about 8 weeks. Precise information is not available, but the domestic Dog goes 63 days and the Red-fox 51; therefore, the White Fox,

[70] Pribilof Islands, N. A. F., No. 46, 1923, p. 105.

[71] Fur Seals, pt. III, p. 348.

whose affinities are between the two, has probably a period between, say, about 57 days.

Over a hundred years ago, Samuel Hearne, with a breadth of experience not since exceeded, wrote that, without doubt, there were breeding places of the White Fox on "every part of the coast they frequent. Several of them breed near Churchill, and I have seen them in considerable numbers all along the west coast of Hudson's Bay, particularly at Cape Esquimaux, Navel's Bay, and Whale Cove, also on Marble Island; so that with some degree of confidence, we may affirm that they breed on every part of the coast they inhabit during the summer season."[72]

In 1829, Richardson, after exploring the region farther west, wrote: "They breed on the sea-coast, and chiefly within the Arctic Circle, forming burrows in sandy spots,—not solitary, like the Red-fox but in little villages, 20 or 30 burrows being constructed adjoining to each other. We saw one of these villages on Point Turnagain, in lat. 68½°."[73]

Miles Spencer, speaking of the east coast of Hudson Bay, says that there "the litters are produced in holes under rocks."[74]

When Nelson landed on Herald Island, off the Siberian coast, he saw a Fox cub which barked at him and then disappeared over the brow of a sheer precipice more than a thousand feet high, on the face of which he concealed himself in some crevice. "Their burrows," he adds, "were found everywhere, and about their entrance, numerous tufts of freshly pulled mosses showed the material of which their beds were made."[75]

Parry found the White Fox on Melville Island the year round, therefore breeding there.[76]

Finally, Preble writes that about 75 miles north of York Factory, "on a slightly elevated part of the tundra, we found a burrow occupied by a family of Arctic Foxes. This burrow was typical, an underground labyrinth with several entrances. In the vicinity were scattered the bones and feathers of various birds, principally ptarmigans, and well-worn trails leading in various directions gave evidence of the activity of the mother Fox, in providing for her family."[77]

There is one other type of burrow—that is, the winter den. Parry (or more probably his able assistant, Lyon) wrote that when these captive

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[72] Journey, p. 365.

[73] F. B. A., I, p. 87.

[74] A. P. Low: Expl. James' Bay, Can. Geol. Surv.,1888, App. III, p. 76 J.

[75] Nat. Hist. Alaska, p. 240.

[76] 1st Voy., 1819–20, pub. 1821, App., p. clxxxvii.

[77] Mamm. Keewatin, p. 62.

Foxes were "placed with their houses upon the ice, they were constantly endeavouring to burrow in the snow within the circle of their chains, and one of them, where the snow lay deeper than usual, soon formed for himself a secure and sheltered apartment under it. When deprived of the means of doing this, they are far from being proof against the severity of the season, for 2 or 3 died on board the *Fury;* entirely from this cause, though furnished with good kennels."[78]

Young

Some time in June usually, but earlier or later, from May to July, according to the region, the young are born. They number from 1 to 11, but are usually 4 or 5.

At birth, they are about the size of a big Meadow-mouse and look not unlike one. They are, of course, blind and helpless. They arrive, however, with a fine coat of fur, and this is of a blue-gray, a dingy smoke colour, or sometimes a sooty black, with occasional spots of white on breast and belly, precisely like those of an adult Blue-fox.

A note that seems to extend the younging time is supplied by McDougall from Port Griffith's, Melville Island. He writes, Sept. 2, 1853: "An old she-Fox, with 6 of her young cubs, was surprised by Mr. Dean, who killed the old Fox, and captured 4 out of the 6 young ones."[79]

Much earlier, that is, about the middle of June, on the Pribilof Islands, the youngsters, now about a month old, begin to come out and see the big world. A curious incident (from which one may draw any kind of moral one chooses) is given by George A. Clark, who was one of the observers sent to the Pribilof Islands, in 1896.

On June 29th he says, "we found a little Blue-fox pup lying outside a den. He looked sick—at least, was not afraid of us—and allowed himself to be handled and photographed. A second one, more timid but full of curiosity, came out of the hole and in a few minutes was ready to play. Mr. Morton offered it a piece of tobacco, which it bit and tried to pull away. Almost instantly the little fellow fell down in convulsions, becoming finally unconscious. It revived in a few minutes, but declined to play further. The incident was a rather unexpected argument against the use of tobacco."[80]

As they grow up, they show early the colours of the adult summer coat. According to Hearne, the "belly, sides, and tail turn to a light ash colour;

[78] 2d Voy., p. 151.

[79] Voy. Resolute, p. 318.

[80] Fur Seals, pt. II, p. 539.

the back, legs, some part of the face, and the tip of the tail, change to a lead colour; but, when the winter sets in, they become perfectly white. The ridge of the back and the tip of the tail are the last places that change to that colour; and there are few of them which have not a few dark hairs at the tip of the tail all the winter."[81]

The Father's Part

If the rule of most *Canidæ* is adhered to, the father leaves home a few days before the arrival of the young and does not return until their eyes are opened. Now, indeed, he comes back. Miles Spencer is among those observers who assure us that the father Fox does his part in rearing the young, and does it with assiduity; which means, he brings game, especially birds, as soon as the cubs are big enough to eat solid food.

For two months this home life continues. Toward the end of August, the cubs are big enough to go a-hunting on their own. They may come back home for a while between hunts, but the parental bonds are already loosening; the old folks have done their duty. The scatteration urge is on the young ones, and long before the sharpening air of October has invited each and every Fox to don his snow-garb, the family ties are broken. The new brood are big folks now. They leave the old den and set forth with all the world before them.

But father and mother still hold on together. They did not forget to store up food when game was swarming about them. In the section on "His Frugal Mind," we have Richardson's picture of the pair working the harvest together. They are, in some measure, independent of the weather. But there is not enough food for the whole family. The young are not allowed to know anything about these hoards.

They must rely on their own powers as hunters, and some indeed, by luck or unusual gifts, can maintain themselves. But the majority, as the pinch comes on, join themselves to the innumerable cub-host, which, without assembling, drifts southward on the great out-trek described, never to return.

Voice

In anatomy, these comic little Snow-dogs are somewhat nearer to Dogs than to Foxes. Their habits, also, are very doggy, and the noises they make are exactly those of some little cur-Dog on the street. First and best known is the bark.

"They sometimes make their presence known to travellers during the

[81] Journey, p. 365.

night," says Nelson, "and I recall particularly that on a fine night, in early January, when I camped at the mouth of the Kuskoquim River, a number of these animals kept about for several hours, within 75 to 100 yards of us, uttering an odd, weak, querulous bark. We broke camp before daybreak the next morning, but none of our friends of the previous evening were heard." [82]

"While hunting for food," says Lyon, "they are mute, but when in captivity or irritated, they utter a short growl like that of a young puppy. It is a singular fact that their bark is so modulated as to give an idea that the animal is at a distance although at the very moment he lies at your feet."[83]

"The voice of the Arctic Fox," according to Richardson, "is a kind of yelp, and when a man approaches their breeding places, they put their heads out of their burrows and bark at him, allowing him to come so near that they may be easily shot."[84] Very doggy is all this, but even more so is the picture given by F. W. True after his visit to the Blue-fox Islands.

"One is not long on the [Pribilof] islands before making his [the Blue-fox's] acquaintance, and his manœuvres are a continual source of interest. Now he will be seen trotting along in the distance, turning neither to the right hand nor the left, and again he will spring up almost from under one's feet, giving utterance to his high-pitched and querulous bark. There is something uncanny in the dogged persistence with which he follows one's footsteps, falling back and barking if one faces about, and drawing near again the instant one proceeds. I took pains on one occasion, when a Fox had been following me for some distance, to ascertain whether these little footpads could be readily frightened away. I commenced by throwing large stones in the direction of the animal, thinking to alarm it, but it merely drew aside to let the missiles pass, and continued to bark at intervals, as before. Finally I aimed some rather smaller stones directly at the Fox, one of which struck it forcibly on the forehead. The Fox merely drew back a little, and barked defiance, so I desisted, fearing that I might kill the animal, which I had no wish to do." [85]

Even the young have this habit. Nelson says that his "party scaled the precipitous walls of Herald Island and found these Foxes in possession. As we were," he continues, "the first men to reach its summit, and but a single party had touched its shore before us, the Foxes were perfectly

[82] Nat. Hist. Alaska, p. 239.

[83] Priv. Journ., p. 75.

[84] F. B. A., I, p. 87.

[85] Fur Seals, pt. III, p. 348.

unsophisticated. A half-grown young one sat on a huge rock over us as we gained the top, and kept uttering a squeaky bark of protest." [86]

Trevor-Battye's description of a cub that he captured in Siberia might apply word for word to any of our smaller Dogs when of tender age. He says:

"I sketched a little 'psi-itz' or Blue-fox and was much amused at the way it behaved to the Dogs. They quite understood that they must not touch it. But old Ni-arr-way would come up and stand proudly over it with his tail moving slowly, and very stiff, as big Dogs are to a puppy. There the little Fox would lie over on its back and mew in a deprecatory way. Besides this, it made two other sounds—a little snarling grunt for human beings and the regular night-cry of the Fox, not unlike the noise of a bantam who has just laid an egg." [87]

Greely says: "Sept. 22, 1882—Another Fox caught alive by Jens. The one first caught is now quite tame, and does not much mind being handled. When stroked, he makes a purring noise, not unlike that of a Cat. He invariably jumps at one's face when it is brought near to him." [88]

Many Polar travellers say that it sometimes utters a strange cry much like that of a hawk, a gull, or a brent goose. For instance, Captain Lyon writes: "While tenting, we observed a Fox prowling on a hillside, and heard him for several hours afterward in different places, imitating the cry of a brent goose." [89]

As elsewhere stated, all animals that have a voice, have also a song. Just what song the White Fox has for love or war, no one seems yet to have recorded.

My friend, E. Norton of Dover, Me., tells me, however, that his Blue-foxes were uproariously noisy on certain nights in winter, the mating season. So much so, that the neighbours objected, and on this account he had to give up ranching Blue-foxes in the town limits.

Habits in General

Dr. D. S. Jordan's experience with the Foxes on Pribilof Island shows them to be in some respects even more doglike than already set forth. He writes: "In our visits to certain rookeries of St. Paul, the peculiar rasping cry of these animals as they caught sight of us, soon became a familiar sound. After a few visits to the Reef on St. Paul, a pair of these Foxes

[86] Nat. Hist. Alaska, p. 240.

[87] A. Trevor-Battye: Icebound on Kolguev, 1895, pp. 244–45.

[88] 3 Years, II, p. 4.

[89] Quoted by Richardson: F. B. A., I, p. 87.

regularly followed us about over the parade ground, dogging our footsteps and at times snapping at our heels. The animals are protected from molestation and annoyance in the summer; as a result of this immunity, they grow overbold and impudent."[90]

Even the wild Foxes in the Far North seem of a like mind. As William Morton says: "These Foxes, when they see a man, do not appear to be frightened; they run a little way, and then sit down on their haunches like a Dog, and face the enemy before running off entirely."[91]

Nelson's language is even stronger. He says: "On the Fur Seal Islands, these Foxes are protected to a certain extent, and are impudently familiar. When one walks across the uplands, the Foxes sit by their holes and bark at him, and often follow from place to place, yelping like ill-mannered curs."[92]

In general, however, the White Fox is nocturnal in his habits. He will mope around or lie in the sun, taking little or no interest in life till the sun goes down. Then in the dusk he becomes all alert, and begins to gambol, frolic, hunt, and trot up and down without ceasing, as indeed is the habit of most Foxes. Nor does he rest till the return of daylight or an overgorge of food sets him once more a-lazying. Nevertheless, it is to be noticed that White Fox, White Bear, White Weasel, and white owl, all the snow-folk, indeed, are in some degree active during both day and night. Evidently they learned to be so in the Far North, where there is nothing but day in summer, and nothing but night in winter.

Trapping

The unfoxiness of the Arctic Fox is very evident when one considers this animal as the trappers' prey. The merest tyro with the poorest kind of trap is a combination quite sufficient to catch in time every White Fox in the neighbourhood.

The pitfall is the chief trap used by the Eskimo, and is as simple as it is ingenious. It consists of a small circular arched hut, built of stones, with a square opening at the top. Over this opening, some thin blades of whalebone are set firmly in the wall at the near end, so as to form an apparently secure footing; at the far end is a bait. A sprinkling of snow adds a final deceptive touch. When the animal attempts to get the bait, the whalebone slats over which it must pass bend downward and drop him into the pit below, which is deep enough to prevent him from jumping out. The

[90] Fur Seals, pt. III, p. 340.

[91] Q. N. A., III, p. 92.

[92] Nat. Hist. Alaska, p. 240.

whalebone immediately springs back, and the trap is ready for another victim.

Yet another used for both Foxes and Wolves is the box-trap of ice-blocks, described in the last section of the "Arctic Wolf."

"The Eskimo trap them with a 'figure-four' deadfall made of logs, stones, or slabs of ice or snow. Steel traps obtained from the fur-traders are also used."[93]

Captain Lyon caught between 80 and 90 in one winter, at the south end of Melville Peninsula. The traps he used "were formed of a small cask having a sliding door like that of a common mousetrap and were baited with oiled meat or blubber." It is hard to imagine a Red-fox or a Wolf being caught in such an obvious trap; yet, says Parry, "The people engaged in watching the trap remarked that no sooner had one of these animals been taken out, and they themselves retired a few yards, than another entered it. So stupid indeed are they in this respect, that, in several instances, those which had escaped from the ships entered and were recaught in the same traps as before."[94]

Not infrequently, Foxes would venture on board the icebound vessels in winter and be caught in traps set for them on deck; on the same principle, perhaps, that many starving Russians in the late war surrendered, because it gave them a chance of being fed.

"Besides taking a trap so freely, they are otherwise so simple, that I have seen them shot offhand while feeding, the same as sparrows in a heap of chaff, sometimes two or three at a shot. This sport is always most successful in moonlight nights; for in the daytime they generally keep in their holes among the rocks, and under the hollow ice at highwater mark."[95]

Two other travellers, however, have ascribed to this Fox a good deal of foxiness or craft. These are Fisher and Greely. Both credit him with playing 'Possum when it seems the wisest course.

Fisher's note runs as follows: Oct., 1819, "Friday, 29th—A Fox was caught last night in a trap set by the *Griper;* he is perfectly white and is about the same size as the Hares that were killed last month; his long, bushy tail, indeed, gives him the appearance of being somewhat larger than them: but as his dimensions will most likely be taken, I shall forebear saying anything more about his size at present. On being caught, he displayed several of the cunning tricks peculiar to his tribe, for when he was taken out

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[93] Nat. Hist. Alaska, p. 240.

[94] 2d Voy., p. 151.

[95] Hearne: Journey, p. 364.

of the trap, he shut his eyes, and lay motionless, no doubt with a view of being taken for dead, so that when those who were around him got careless, he might watch an opportunity of getting off. Such an artifice might, and very probably does, enable these animals to escape from the Bears and Wolves occasionally; with his present captors, however, his wily tricks have little chance of affording him an opportunity of effecting his escape. He is not hurt in any way, for he was caught in an empty cask with a slide in one end of it, which fell and shut him up in it immediately he laid hold of the bait within."[96]

Greely's note is of similar tenor. He says: "Biederbick shot a Fox the other day, but, neglecting to load his gun at once, lost him, as the Fox was playing 'Possum. He was much chagrined to have Reynard jump up and run on his near approach."[97]

These Ellesmere Land Foxes seem unusually keen, for Greely says:

"He is much more wary and cunning than his brethren of the same species a few degrees of latitude to the south. It was very rare that a hunter could get within gunshot, and poisoned meat was so carefully rejected that, despite frequent baits, only one was obtained in that manner."[98]

Tamability

This simple-minded, light-hearted Robin Goodfellow of the snow is by far the most tamable of his family.

"If taken young, they are easily domesticated in some degree; but I never saw one that was fond of being caressed; and they are always impatient of confinement."[99]

"Although the rage of a newly caught Fox is quite ungovernable, yet it very rarely happened that, on two being put together, they quarrelled. A confinement of even a few hours often sufficed to quiet these creatures; and some instances occurred of their being perfectly tame, although timid, from the first moment of their captivity. On the other hand, there were some which, after months of coaxing, never became more tractable. These, we supposed, were old ones."[100]

A specimen captured by Doctor Fisher is thus recorded:

"He became daily more domesticated, and was latterly so tame that a person might handle him with great freedom without running any danger

[96] Voy. Disc., pp. 148–49.

[97] 3 Years, II, p. 3.

[98] As above, p. 366.

[99] Hearne: Journey, p. 365.

[100] Lyon: Priv. Journ., p. 75.

of being bitten; he ate any kind of food that was offered him, but what he chiefly subsisted on was bread and peas."[101]

"Those they captured were easily tamed, seldom attempting to bite, even when first caught, and by wrapping a cloth around the hand, some of them could be taken out of the barrel and held, not offering more resistance than a snap at the cloth."[102] (Morton)

On Oct. 19th, Captain Lyon captured a Dog-fox, of which he says: "He was small and not perfectly white; but his tameness was so remarkable that I could not resolve to kill him, but confined him on deck in a small hutch, with a scope of chain. The little animal astonished us very much by his extraordinary sagacity, for during the first day, finding himself much tormented by being drawn out repeatedly by his chain, he at length, whenever he retreated to his hut, took this carefully up in his mouth, and drew it so completely after him, that no one who valued his fingers would endeavour to take hold of the end attached to the staple."[103]

Greely says of one he held captive: "When caressed, he gave out a purring sound, which we thought to be a sign of pleasure."[104]

Referring to some captive Foxes, Morton is cited by Bachman to the following effect: "They were kept on board the vessels for some days and afterward let loose; they did not always appear very anxious to make their escape from the ships."[105]

But here, as always, in analyzing the mentality of all highly developed animals, we must allow for enormous individual variation. Thus during January, 1822, while at Winter Island, Capt. Geo. F. Lyon captured many White and 2 or 3 Blue-foxes, of which he says: "The great variety of dispositions displayed by those which were kept for taming, was very remarkable, some being gentle and quiet from the time of their first coming on board, and others remaining wild and intractable in spite of every kindness and good treatment. Our Dogs became familiar enough even to play with them; but the Foxes were, on their part, never entirely free from apprehension on this account. The noise they make when irritated is a weak, half-stifled sort of bark, but they have also a more shrill and piercing cry when much frightened."[106]

[101] Voy. Disc., p. 163.

[102] Q. N. A., III, p. 92.

[103] Priv. Journ., p. 64.

[104] 3 Years, II, p. 367.

[105] Q. N. A., III, p. 92, referring to animals taken by crew of the Advance, off Greenland.

[106] Parry's 2d Voy., p. 151.

His Daily Life

The blizzard wind has blown all day—the short, dark day of the Polar Sea. The little Snow-dog has lain curled up in the hole he dug for himself in a snowdrift. The day before, he had slept in a natural cave in the ice, and the day before that, he crawled into a rocky crevice on the high land twenty miles away. Such is life for him in the region of winter; but he carries warm wraps of his own, and, like other Polar explorers, he does not mind the cold so long as he can keep out of the wind and find food.

Now he is hungry. He stretches, yawns elaborately, examines a near-by bump, decorates it with his kidney product, blinks his yellow eyes at a distant ridge, and then sets out at a trot to find a meal. The wind has sunk from a gale to a stiff breeze. He trots off, not with the wind (that would be dangerous), nor against it (that would be hard), but angling so that the slightest whiff of food is sure to reach his wise little nose. In this hard white land, in winter at least, the source of nearly all food is the open water of the sea. The ever-changing edge of the floe ice is the hauling-ground of the Seal and the prowling range of the great Ice-bear. The Bear can kill the Seal, and the little Ice-dog, yapping at a safe distance, can oftentimes rush in and get scraps, trusting to his winged heels to avoid the ice-king's wrath; or he can wait till the king has fed and retired, then rush in to a banquet. There are birds to be had also; even in winter, there may be ravens and little auks. These swift creatures capture fish and shrimps in the sea and carry them to the ice to eat; and now is the chance for the little Ice-dog to maraud the marauders. A crafty stalk and sudden dash, and the original pirate has lost his prize to pirate No. 2. Once in a million times he encounters a camp of men that unwittingly enrich the fox-range with the wasted fragments of their destruction. Again, fish and crustaceans of many kinds are sometimes ploughed up by travelling icebergs and tilting ice.

And when kindly old Mother Sea has nothing in her cupboard for her Snow-dog, he can at least head for the nearest land, a trifling thirty white miles away, and here, in sheltered valleys, nose about for Lemmings. Plentiful indeed are these Snow-mice, but usually far down, hard to get at, well protected by a thick, strong sheet of ice and wind-hammered snow. This was the Fox's home range last summer; here he may yet find a ptarmigan, or get some Snow-mice. He can certainly get some birch and willow browse, and twigs to fill his small belly, and keep those hot little millstones, the stomach-walls, from grinding

each other in their idleness. But—and this was most likely the main impulse that brought him—here, in the last year's time of plenty, he made many little caches of food, mostly of Snow-mice, but some of Snow-grouse eggs and a dried-up corpse or two; for if the pinch of dire famine be on him, even musty feathers have their charm. A score of these caches he may have made, each one of which may contain two or three square meals; and two or three square meals a week are, as is well known, all that any one needs unless that one chance to be a besotted, three-meals-a-day sybarite, and for such the Polar islands are no place.

First our Snow-dog sets about finding the blessed spot. Not an easy matter, indeed, for the landscape has changed, and the cache is buried deep. But he knows his own range, his memory gives him general guidance; and the protometric record at the spot has not been entirely washed away.

Yes, surely this is it; and he digs with all the energy of his famine-driven frame. Down, down, he goes. The upper snow yields easily; then comes the lower and harder snow; at last he reaches the frozen ground which needs both tooth and claw to penetrate it. But there is no longer any doubt that he has found the spot. He digs more eagerly than ever, and with watering chops; for already the sweet, luscious Snow-mice are within smell-reach.

But now, buried though he be, his exquisitely sensitive ears give warning of a faint, far snow-craunch. Instantly he is out of his hole and on the alert; for these are parlous times, and there are both Bears and Wolves on this high island. But luck is with him. Neither monster is near. Here, gazing at him, not many hops away is—another Fox—a Snow-dog like himself—and hungry too; for snow and hunger are interchangeable terms in the Far North. But property is property, and the first little Snow-dog needs all he has or can get; so he curls up his tiny black snout, wrinkles his snow-white visage, and shows in their red setting a double row of ivory teeth. Then through them sends the harshest rumblingest growl at his command—a plain intimation to No. 2, "You are a trespasser, a burglar, a bandit; and if you come nearer, you shall pay an awful price."

No. 2, a walking snow-bump like himself, approaches slowly, and both circle so as to get each the other's wind. Then No. 1, still angry and masterful in his righteous indignation, gets proof that No. 2 is an old acquaintance, a friend. Still nearer they approach, No. 2 droops low the tail, raises its base a little, and flings on the wind the odour-musk from the caudal gland, that is the identification disc of their race. No. 1 now does the same, for that is law. Each grins a friendly grin, and slowly, but at last completely, each recognizes the other as a mate. Male and female they

are—husband and wife. Far apart they have drifted since the happy summer days they spent together in this valley, but now are brought together again by their common knowledge and their common need.

However, the question of the cache is still before them. It may be common property, but most likely it was made by the little he-Dog, for he went direct to it. Anyway, he warns her back, and keeps on digging till the pile of frozen Lemmings is unearthed, still fresh and good, for last summer he had packed them well on ice. He had dug down to the frozen earth, and the Lemmings have lain on it, hard frozen ever since. So he feasts gloriously upon them, and when he has half done, he allows his mate to shoulder in beside him and finish what is left.

Now both are full and happy. They can go a week, if need be, without further sustenance, but their energy, hardihood, and optimism will surely lead them to other foods before they suffer much from the hunger-pinch.

After this, they drift apart again; and in some hole he knew of old, or has found new-made by the accident of frost, our Snow-dog settles to rest muffling his nose and paws in his huge warm tail, leaving only his sentinel ears to stand a-cock above this rounded mass of living snow. But that is enough, for it is a physical impossibility to come unawares on one of these creatures asleep, so exquisitely attuned are their keen ears to every sound, however slight, that comes within the danger zone.

The frost may intensify to 60° below, the wind may rise to 60 miles above—but he curls up happily to sleep. "Fate cannot harm him—he has dined to-day."

One naturally asks, why, if the Foxes have their food caches, do they not stay near by and live on them, as do Squirrels and other provident creatures.

The answer seems to be that the caches are made in summer when food abounds. In early winter, food still abounds, and the Snow-dogs are lured on and far away by the joys of the chase, by the lure of life and travel. Sometimes it is likely they forget the place of the cache; doubtless, many of their stores are found and stolen by Bears and Wolves. Foxes have some respect for each other's property when marked as already described; but a starving Fox will hold to the more ancient rule that self-preservation is nature's first law, and will eat when a chance turns up, as surely as will a starving man. So that, though the cache is a good thing when it can be made and carried over, it is subject to too many risks to be relied on for support without continual hunting.

A hundred Arctic explorers have summered and wintered with the White Fox, and all present more or less delightful pictures of this cheerful

PLATE XCII.—FOX STALKING A RABBIT
By E. T. Seton, 1897
From drawing loaned by New York Zoological Society

PLATE XCIII.—FOX APPROACHING TO ATTACK (A GOAT)
Life study by E. T. Seton, 1880

little simpleton making his merry best of the hardest life that well can be imagined. His nose, of course, is his safest, his wonderful guide. Its high-strung sensitivity can analyze the countless wireless messages on the wind, and tell him of meals, possible or promised, many miles away.

This explains why a vessel, wintering in the Polar ice, quickly becomes a centre of attraction to many Polar Foxes. Let the south wind blow for twenty-four hours, and down from the north, their analytic noses in the wind, come capering and drifting these merry Snow-dogs. The west wind blows and the east contributes more of their pure white blowsy forms, invisible in their spotless purity, till yellow eyes and coal-black noses appear from nowhere on the nearby snow.

Thereafter they hang about the vessel, for it yields them scraps of food. So also, in the far Northwest, they haunt the traders' houses. Full of promising odours is the air around these outposts night and day; overpowering is their allurement to a Snow-child that may have had only one meal a week for long past.

But around both ships and trading posts there are dangers too; dangers multiplied indeed to the measure of their promise. Men, guns, traps are there, and worse, a pack of hostile Dogs. But courage is a winner, and the White Fox, taking his life in his teeth, sneaks, like a moving snow-bump, into this devil-guarded Eden. And oftentimes he wins, but sometimes fails; and those who love a brave adventurer will read this story of a failure—read, but read with sorrow. Yet they should read, for it will establish firmly this north-wind optimist in the hearts of all who love a brave little heart. This is the tale as it was told me by my friend, Nelson, the naturalist.

The End of a Small White Hero

While he was living at St. Michael's, Alaska, he says, in the depths of a hard and snowy winter, a foraging White Fox came up by way of a high snowdrift to the warehouse roof, and looked down into the courtyard below, where, lounging about, were a large number of Dogs. Some of these spied the intruder. He made off, but, after a chase of a couple of hundred yards through the deep snow, was overtaken by a big long-legged white Dog. The moment the pursuer came up, the Fox threw himself upon his back and held up his paws as if to play. Oh, clever dodge! does not a puppy disarm a hostile Dog by just such complete submission and appeal? The big Dog stopped short in amazement, accepted the friendly overture, and then began to frisk about as if in play with another Dog. A moment later, the rest of the yelping pack came up, and excited by their cries, the first Dog forgot his

better nature, broke the truce, and treacherously tried to seize the Fox. But the Snow-child caught his foe by the end of the nose with such a grip that the big Dog, utterly discomfited, retreated toward the houses, howling dolefully, and dragging his plucky little antagonist with him. It was only when near the houses, right in their own camp with all kinds of support, that the other Dogs succeeded in tearing loose the Fox—yes, dragged him off—but he took with him part of the enemy's nose and lip. Then the howling mob closed in. A few seconds later, the heroic little Snow-fox died in the midst of his enemies, bravely fighting, but overwhelmed by a score of Dogs, any one of which was three times as big as himself.

Do not forget it, reader, for the story is true; true in detail and true as a big parable. And the next time you see, or wear, the pelt of an Arctic Fox, it would not be amiss to hope that you yourself may meet hard life, or grim death, with fortitude as unflinching as that of this cheerful child of the snow.

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A Life of Adventure.

Common Red-fox, American Red-fox, Red-fox, Reynard, Cross Fox, Silver-fox, Black Fox

Vulpes fulva (Desmarest)

(L. *Vulpes*, a Fox; L. *fulva*, yellow; because it is yellow compared with the Red-fox of Europe.)

Canis fulva Desmarest, 1820. Mammalogie, I, p. 203.
Vulpes fulvus DeKay, 1842. Zoöl. of New York, Mamm., p. 44.

Type Locality—Virginia.

French Canadian, *Renard.*
Cree, *Wah-kus'.*
Ojibwa and Sauteaux, *Wah-gush'.*
Chipewyan, *Nak-ee'-they.*
Ogallala Sioux, *Shung-ka-ge'-lah.*
Yankton Sioux, *Song-kee'-na.*

The genus *Vulpes* (Brisson, 1762) comprises dog-like animals of small size, with long, bushy tails (more than half the length of the body); long, soft fur; long, sharp muzzle; large ears; long, sharp, semi-retractile claws; linear eye-pupils; and teeth as follows:

$$\text{Inc. } \frac{3-3}{3-3}\text{; can. } \frac{1-1}{1-1}\text{; prem. } \frac{4-4}{4-4}\text{; mol. } \frac{2-2}{3-3} = 42$$

The number is the same as in *Canis*, but they are different in detail, as well as much more slender in general.

In addition to these generic characters, the American Red-fox has the following:

Size. Length, about 40 in. (1016 mm.); tail, 12½ in. (318 mm.); hind-foot, 7 in. (178 mm.). The ♀'s are about one tenth smaller.

Weight. An adult taken at Carberry, Manitoba, Oct. 27, 1884, weighed 10 lbs. An adult ♂ is given by Bachman at 14 lbs.[1]

DeKay says a large ♂ "weighed 11 lbs., and I have heard of others weighing 15 lbs., but such are not common. The largest I ever heard of was

[1] Q. N. A., I, p. 46.

a ♂ on the fur-ranch of E. Norton at Dover, Me., it weighed 16¾ lbs.: the usual weight is from 8 to 10 lbs."[2]

This shows our Fox to be much smaller than the British Fox. The latter, according to J. G. Millais, weighs, ♂'s 15 to 20 lbs., ♀'s 10 to 15 lbs. The largest ♂ he ever saw turned the scales at 24 lbs.; 29 lbs. being the record for this species in Wales.[3] Yet Nelson thinks Alaska Foxes probably the largest in the world.[4]

Colour. When seen at a distance our Red-fox looks like a large golden-red animal in black boots, with black ears, and with an enormous tail that is white-tipped. On closer view, the golden-red turns out to be the play of a multitude of exquisite autumn tints. On muzzle, neck, and shoulder it is a deep, tawny orange; on back and rump, it shades into a sort of grizzling or speckling of dull white and reddish brown that looks almost pink in some lights. These back colours melt into a lovely golden brown on flanks, rump, and tail. But the tail is washed over with reddish brown sprinkled with black, and ends always in a *big white tip*, even when the animal is a melano. The ears inside, cheeks, throat, and under parts are white. In most, the belly is tinged with very dark gray. The back of the ears and upper part of each foot and leg are black.

This is, indeed, a flat enumeration of its flat tints, but gives no conception of the marvellous colour beauties of its exquisitely blended tawny pinks, russets, and yellow-browns, set off by the old gold, dull silver, and shining ebony of its extremities.

Freaks. Black, Silver (*i. e.*, black, frosted over with white) and Cross Foxes are well-known colour variations in this species; these forms are mere colour freaks and may be found in the same brood with those of ordinary colour.

A notable example of this is given by A. P. Low in his "Mammals of Labrador," as follows:

"On the Moose River, in 1887, the writer found a litter containing 7 Kits: of these 2 were Red, 3 were Cross, and the remaining 2 Blacks or Silver—thus showing that the colour of Foxes no more constitutes varieties than does the difference of colour in a litter of kittens of the common Cat. There appears to be a greater proportion of dark-coloured Foxes in the northern region than in the southern."[5]

The Cross Fox, according to a current belief, gets its name from the assumption that it is a cross between the Red and Silver-black Foxes, but

[2] Nat. Hist. N. Y., I, p. 44.

[3] Mamm. Gt. Br. & Ire., I, p. 202.

[4] W. A. N. A., p. 417.

[5] Mamm. Lab. Penin., Can. Geol. Surv., 1896, p. 314L.

PLATE XCIV.—THE FOX SPRINGING ON THE PINTAILED GROUSE THAT HE LOCATED BY SMELL AS IT SLEPT UNDER THE SNOW

LATE XCV.—THE FIRST WHIFF

PLATE XCVI.—THE LAST GLIMPSE

From paintings of the Manitoba Fox made by E. T. Seton in 1886

it seems that the adjective really refers to the dark cross on its shoulders. Richardson speaks of its "cruciform markings";[6] and Gesner named it *crucigera*. Bachman gives it "a cross on the neck and shoulders . . . black";[7] and other writers make similar allusions.

Another freak is the "scorched" or "Samson Fox." This has no long fur, nothing but wool; the cause of this is not understood, and the pelt is worthless commercially.

Races

The following forms have been recognized:

fulva Desmarest, the typical form from Virginia.

macrourus Baird. Much like *fulva*, but with *tail much longer*, and black on legs less extensive. T. l., Wahsatch Mountains, bordering Great Salt Lake, Utah.

necator Merriam. Much like *fulva*, but cranially related to *macrourus*. T. l., Whitney Meadows, near Mount Whitney, Cal.

cascadensis Merriam. A short-tailed, small-toothed Fox, much like *fulva*. In red pelage, like a small edition of *regalis*. T. l., Trout Lake, south base of Mount Adams, Wash.

rubricosa Bangs. Larger than *fulva*. Colour deepest and darkest of all. T. l., Digby, N. S.

bangsi Merriam. Like *fulva*, but ears smaller. Less black on ears and feet. T. l., L'anse (Lance) au Loup, Strait of Belle Isle, Labrador.

deletrix Bangs. Like *rubricosa*, but very pale straw colour. No black basal spot on tail. T. l., Bay St. George, Newfoundland.

alascensis Merriam. A large, coarse-haired, yellow Fox. Near kin to the *V. vulpes* of Siberia and Scandinavia. Tail very long. T. l., Andreafski, Alaska.

abietorum Merriam. Skull like that of *alascensis*, but slenderer. Appearance unknown. T. l., Stuart Lake, B. C.

kenaiensis Merriam. Large. Skull, long and slender. Appearance unknown. T. l., Kenai Peninsula.

harrimani Merriam. Large. Tail enormous. A curious mane on neck. T. l., Kadiak Island, Alaska.

regalis Merriam. Largest and palest of all. Tail very long. T. l., Elk River, Sherburn County, Minn.

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[6] F. B. A., I, p. 94. [7] Q. N. A., I, p. 45.

Range with Map

There are few animals in America with a wider range than the Red-fox group. It is generally dispersed in wooded regions of America from Atlantic to Pacific in a wide belt that is bordered on the north by the Arctic region and on the south by a line that is nearly on N. lat. 35°.

This is one of those species that have kept pace so completely with the times that it is extending its range, and probably increasing in number.

Importations from Europe

At one time the Red-fox was exceedingly rare in the Eastern States, if not entirely absent. This has given rise to the report that it is not an American species, but a European introduction specially brought by fox-hunting enthusiasts. But we are confronted by the fact that the Fox has always been found in the North and Northwest. Here is some of the testimony:

"In earlier colonial times," says Rhoads, the Red-fox was "unknown in the austral zone, its primitive distribution being greatly altered by its introduction into austral habitat by fox-hunting man and by the altered environment of our lowlands. Owing to the importation of European Red-foxes into this country in early colonial times, our east American Red-fox is probably a mongrel species to that extent, claiming as we do that there was originally a specific difference between the two. . . .

"Kalm in his 'Travels', vol. I, 1770, p. 283, says 'the Red-foxes are very scarce here [Pa. & N. J.]; they are entirely the same with the European sort.' He further states that Bartram, of Philadelphia, told him the Indians were unanimous in saying the Red-fox was never in the country before the Europeans. In a discussion of the identity of the American and European Red-foxes in 'Doughty's Cabinet of Natural History,' 1830,vol. I, pp. 28, 29, there occurs the following significant allusion to the former absence of the Red-fox in Perry County, Pa.: 'In 1787, when quite a boy, I was at the death of the first Red-fox in Perry County, Pa. Not a person present, nor any who saw it for some days, had ever seen or heard of an animal of the kind. At last it was shown to a Mr. Lenarton, an old Jerseyman, who pronounced it an English Fox. He said the Red-fox was imported into New York from England by one of the first English governors, who was said to be a great sportsman, and turned out on Long Island, where they remained for many years, but at last made their way on the ice to the mainland and spread over the country.'"[8]

[8]Mamm. Penn. & N. J., pp. 145–46.

MAP XI. RANGE OF THE RED-FOX

By E. T. Seton, with assistance of the Biological Survey, 1923

The Red-fox is found yet throughout its ancient range and is spreading southward. Many of the blank areas which are seen within the main range outline will probably be filled within a few years.

The following from Bachman records the fact that a large part of the country inhabited by the Red-foxes in 1850 was without them a hundred years before.

"In the early history of our country the Red-fox was unknown south of Pennsylvania, that State being its southern limit. In process of time, it was found in the mountains of Virginia, where it has now become more abundant than the Gray-fox. A few years afterward it appeared in the more elevated portions of North Carolina, then in the mountains of South Carolina, and finally in Georgia; where we have recently observed it.

"This species was first seen in Lincoln County, Ga., in the year 1840; since then it has spread over the less elevated parts of the country and is not rare in the neighbourhood of Augusta.

. . . . . .

"Its southern limit at present [1849] is Abbeville, in South Carolina, and Augusta, in Georgia; a few individuals have been seen in those States, near the seaboard. It also appears in Tennessee, Kentucky, and Missouri. We have not heard of its existence in Florida, Louisiana, or Texas."[9]

"In view of these statements," continues Rhoads, "and of the fact that European Foxes had been introduced into New England, Pennsylvania, and Virginia for sporting purposes by the middle of the 18th Century (1750), it looks quite likely that the Red-foxes mentioned by Kalm as being found in New Jersey and Pennsylvania in 1770, also the one found in Perry County in 1789, and those described by Desmarest as coming from 'Virginia' in 1820, were pure descendants of the European Red-fox. In such a case *Vulpes fulvus*, of course, is a synonym of *Vulpes vulpes* (Linnæus).

"Where then was the American Red-fox in pre-columbian times? If it was not in Perry County in 1789, nor in the mountains of Virginia till a much later date, it must have been somewhere in the region north of the Great Lakes or in the Hudson Bay regions, where the Delaware Valley Indians, who talked to Bartram, could not come in contact with it. This was probably the case, and in these regions only are we to seek for specimens to establish the real differences between the two continental forms. No doubt the difficulty of determining the status of the two in the past has been due to the use by naturalists of specimens more or less thoroughly European in their ancestry."[10]

Prof. S. F. Baird offered some pointed testimony on this question so long ago as 1857. He says: "It is not a little remarkable that there have

[9] Q. N. A., II, pp. 270–71.

[10] Mamm. Penn. & N. J., p. 146.

as yet been no remains of the Red-fox detected among the fossils derived from the Carlisle and other bone caves. The Gray-fox is abundantly represented, but not a trace of the other. This would almost give colour to the impression, somewhat prevalent, that the Red-fox of eastern America is the descendant of individuals of the European Red-fox imported many years ago, and allowed to run wild and overspread the country."[11]

Reference to the older travellers implies that the Red-fox was unknown in all the wooded sections of America. Alex. Henry, writing about 1800, records it but once,[12] and then in prairie country (Manitoba). Long does not mention it in his journey across the Plains up the Platte to the mountains, and back down the Arkansas in 1819–20. Carver's Minnesota record is too vague to be of service. Richardson, however, in 1829, calls it "very plentiful in the wooded districts of the fur countries."[13] After this, it seems to be reported generally abundant.

This then is the broad conclusion imposed by the evidence: A Red-fox was native to America north of lat. 40° or 45°, but was scarce in the unbroken forest. The European Red-fox was introduced into the region, including Virginia, about 1750. It has mixed with the native Red-fox and the offspring spread and increased through the forest region as it was opened up, until now their descendants are found in places south to latitude 32°.

Home Range

The home locality of the individual Fox is, I think, not more than 5 miles across. Ordinarily, it does not range so far, but, under unusual stress of famine, will cover even a larger area. The evidence is that, when pursued by Dogs, the Fox usually circles at a radius of 2 or 3 miles, differing, of course, with the character of the country; also that a number of well-known Foxes, such as the "Mahogany Fox" of Hartford, Conn., "Baldy" of Berkeley, Va., and the Black Fox of Blacktail Creek, Wyo., were known and watched for one or more years and usually found within 3 or 4 miles of their reputed headquarters.

Since writing the above, E. Norton, a well-known fox-breeder of Dover, Me., has given me the following corroborative information.

In March of 1885, he and his brother went out near Dover with their fox-hounds, hoping to run a she-Fox to earth and dig her out for a breeder. They soon had one holed up, but were disappointed to find it a dog-Fox in half-shed coat; he was not worth skinning, so they cut the top off one ear and

[11] Pac. R. R. Rep. Mamm., 1857, p. 130.

[12] Journ., p. 108. See Lynx References.

[13] F. B. A., I, p. 91.

slit the other, then turned him loose. Five years afterward he was killed within 4 miles of where first they had caught him.

At Green Lake, Ont., was a Silver Fox that ranged there for a couple of years. My informant, George Linklater, says it covered 10 miles, or not more than 15, of country, and was there the year round.

The habits of the English Fox affirm this. All the keepers and hunters that I have consulted believe that a Fox rarely goes more than 4 or 5 miles from home, except when hunted.

But in the winter it roams over an extent of country probably two or three times as large as its summer range. A Black Fox that lived on the "Big Plain," Man., was seen about Carberry as far north as Petrel, 9 miles, and south to the Sandhills, 4 miles. There is no certainty that it was the same Fox, but when one was killed at Petrel it also disappeared at Carberry, and if it had lived only about Carberry, it would have been seen oftener. This seems to give it a winter range of at least a dozen miles in diameter.

Joseph M. Dohan of Philadelphia writes me: "I have known such [a strongly marked] Fox to live in the same district for four or more years. Of course, they are frequently moved by farmers or boys interfering with the earths."[14]

Numbers

Much observation and many calculations incline me to believe that 20 per cent. drain per annum is all that most animals can stand and keep up their numbers. Especially is this true of Foxes. So that, knowing the annual toll of the trapper, and the fact of unchanged abundance, we can make a fair guess at the minimum total population.

In 1921–22, according to the Government Report, 2,943 Fox pelts were marketed from the Province of Manitoba with its land surface of 230,000 square miles. These pelts presuppose a kill of at least 6,000 Foxes, and this is not more than 20 per cent. of the total number, since they can stand the drain. Therefore, the Fox population of that Province is probably 30,000, or 1 to 8 square miles, in spite of the fact that $\frac{9}{10}$ of the Province is the uncongenial spruce forest. The small portion remaining being the fat prairie country abounding in the food possibilities of well-stocked farms.

That these figures are not an overestimate will appear on setting the facts side by side with those supplied in the "Old Country."

After consulting many of my hunting friends, I learn that about 11,000 Foxes are killed each year before the hounds in Great Britain; while the destruction by keepers, etc., at least doubles the number destroyed annually

[14] Letter, Sept. 22, 1905.

Genus Vulpes.

Plate Lxxxvii.

Skull of Red-fox (*fulva*) ♂ ¼ Amer. Mus. 11066

on the 80,000 square miles of the British mainland, and would argue a vulpine population in the autumn of fully 40,000, to compare with the 30,000 that I give as a conservative estimate of the Foxes on Manitoba's much larger range. But of course, the Foxes in England are carefully fostered to abnormal numbers.

The State of Pennsylvania has 45,000 square miles. According to the Pennsylvania Game Commission, bounties were paid on 24,922 Red-foxes killed in the State during the $6\frac{1}{2}$ years between April 15, 1915, and Dec. 31, 1922. The last year 3,525 were reported, and there is apparently no diminution of the Fox numbers. Therefore, there must be a minimum of 20,000 Red-foxes in the State, or 1 to every $2\frac{1}{4}$ square miles.[15]

A still more striking, if less reliable idea, of the Fox numbers on a given range is afforded by the following:

A great fox-hunt operating as a shot-gun drive and surround, by 200 hunters and farmers, was arranged in Burlington County, N. J., during Jan., 1921. The drive started from Knight's Bog and covered about 10 square miles. More than 30 Foxes were killed that day, but scores eluded the hunters. The number of Foxes seemed about the same, so that other hunts were arranged to cover the same ground.[16] If this newspaper report is correct, it implies over half-a-dozen Foxes to the square mile in Jersey, a region especially fitted to feed and protect them.

A. N. Meilinggaard of Greenwich, Conn., gives me the following interesting account of the Fox on his native island, Lessö in the Kattegat, Denmark. Lessö is about 10 by 12 miles, low and sandy, and averages only 8 feet above water level. The inhabitants are Danes, about 1,700 in number, all sailors and farmers. They are confined to the southern third of the island. The northern two thirds is a wilderness of sand dunes and ling wastes—no rock whatever. The only thick cover is a stretch of spruce and birch about a mile long and half a mile wide.

The island is infested with Foxes, which do a great deal of damage to chickens, notwithstanding unremitting persecution and an annual drive covering the whole island. In the annual drive, a dozen or more are taken —either shot or smoked out of their holes—and many others killed during the year. Yet they defy all attempts to exterminate them.

They continue as numerous as ever. No black ones are ever seen. Poison is not used. There are no Rats on this island; often the pests land from ships, but speedily disappear, thanks to the Foxes.

Since my contention is that the Foxes can stand an annual drain of

[15] Seth E. Gordon: Bull. Am. Game Prot. Ass., Jan., 1923, p 10.

[16] Philadelphia Inquirer, Jan. 23, 1921, p. 10.

PLATE CI.—FOXES FIGHTING

Drawn from the description by L. W. Walker, who witnessed the scene many times in Yellowstone Park
The use of the tail as a foil was continually remarked

PLATE CII.—A WINTER MEETING OF FOXES, APPARENTLY THEIR ONLY SOCIAL GATHERING

20 per cent., there are at least 100 Foxes on Lessö, or one to the square mile.

A summing of these cases shows: In England, 1 Fox to every 2 square miles; in Manitoba, 1 Fox to every 8 square miles; in Pennsylvania, 1 to every $2\frac{1}{4}$ square miles; in Lessö 1 to every square mile.

In round numbers, the Red-fox range is 5,000,000 square miles, extending from Atlantic to Pacific, and from the northmost limit of trees to N. lat. 35°, wherever there is wood and water quite unevenly distributed; for complete civilization and unbroken wilderness are equally impossible conditions for the Fox.

If, then, the average be 1 Fox to every 4 square miles, we have not less than 1,000,000 Red-foxes on the range.

The fur returns (given later) show an annual catch of 74,000 Red-foxes with marketable coats. The destruction by other causes such as Lynxes, Wolves, Dogs, eagles, guns, poison, and disease, will surely double this, but their numbers seem to stand the drain, showing this to be not more than 20 per cent. This, I take it, assumes a wild stock of at least 500,000, possibly 1,000,000, on the range covered by the Red-fox group. It may safely be set at 750,000.

Fur

The first year when the Hudson's Bay Company's operations extended without opposition over all the fur country of British North America was 1821. Therefore, we have complete fur lists beginning then only. In using these lists, one must remember that they give the year of marketing, whereas the furs were taken the year before; also certain returns had two years' catch represented, others but half a year's catch.

During the 85 years, 1821 to 1905 inclusive, the Hudson's Bay Company collected 1,536,420 skins of this species; an average of 18,075 for each year. The lowest was 2,757 in 1826, the highest 52,693 in 1876. The average for 10 years, 1895 to 1905, was 22,671.

Poland's lists show that during the 71 years, 1821 to 1891 inclusive, 3,831,516 skins were taken by the other American companies, an average of 53,965 each year. So that the average annual catch of American Red-foxes for fur is about 74,000.

At the London annual fur sale held by Lampsons', March, 1906, the highest price reached was 41 shillings ($9.84) each for 288 dark skins. First-class skins brought usually from 15 shillings to 30 shillings ($3.60 to $7.20), but inferior skins sold as low as 1 shilling and 2 shillings (24 cents and 48 cents). During the great fur-boom of 1919–20, Red-fox pelts taken in Canada

brought an average price of $22.29; the total number taken in the Dominion was 30,317.[17]

Cross Fox. The Cross Fox is the half melanism or partly black freak. At the above sales 3,697 Cross Foxes were sold. The highest price realized was 75 shillings ($18) each for 26 first-class dark skins, but 30 shillings to 35 shillings ($7.20 to $8.40) may be considered ruling prices for first class, from which they graded down to 20 shillings ($4.80) for second class, and 7 shillings ($1.68) to 15 shillings ($3.60) for third class. In 1919–20, the average price of Canadian pelts was $63.81 and the number taken in the Dominion 3,659.[18]

Silver Fox. The most valuable fur in the world is doubtless that of the rare and wonderful Sea-otter. A prime skin of this brings $1000 or more. Next to the Sea-otter comes the Black or Silver Fox. This is, of course, simply a superb melanism of the common Red-fox. It is intense black with more or less silvering of the hairs on head and rump, the less silver the higher the value.

Miller Christy sends me the following interesting item: "At the Hudson's Bay Company annual fur sale, held in London, March, 1900, 601 Silver Foxes were sold, bringing an average price each of £50 16s. 1d. ($247), and 3 especially fine pure black skins brought, respectively, £310 ($1,507), £340 ($1,652), and £400 ($1,944); that is, £1,050 or $5,103 for the 3.

The record price for a Black Fox pelt is, according to D. A. Boscowitz, £540 ($2,625), given by Grunwalt, of Paris, in 1889, at C. M. Lampson and Company's sale. During the great boom of Fox-farming (1915–20), $34,000 was paid for one pair of pedigreed Foxes of pure black strain.[19] Such a purchase, however, can scarcely be considered a representative commercial transaction.

At the London annual fur sales, held by Lampsons', March, 1906, 992 Silver Fox skins were sold.

The highest prices realized were £320, £310, £310, £280, £220, £210, £190; that is, $1,555, $1,506, $1,506, $1,360, $1,070, $1,020, $883. These were for skins of unusual size and marvellous beauty. The ordinary run of first-class skins brought only £50 to £80 ($243 to $388), and many Silver Foxes of inferior quality brought only £1 or £2 ($4.80 to $9.60). In the great boom of 1919–20, there were sold 3,931 Canadian Silver Fox pelts at an average price of $246.46.[20]

[17] Govt. Report.

[18] As above.

[19] Silver Fox Farming, U. S. Dept. Agri. Bull. 1151, p. 3.

[20] Govt. Report.

Genus Vulpes.

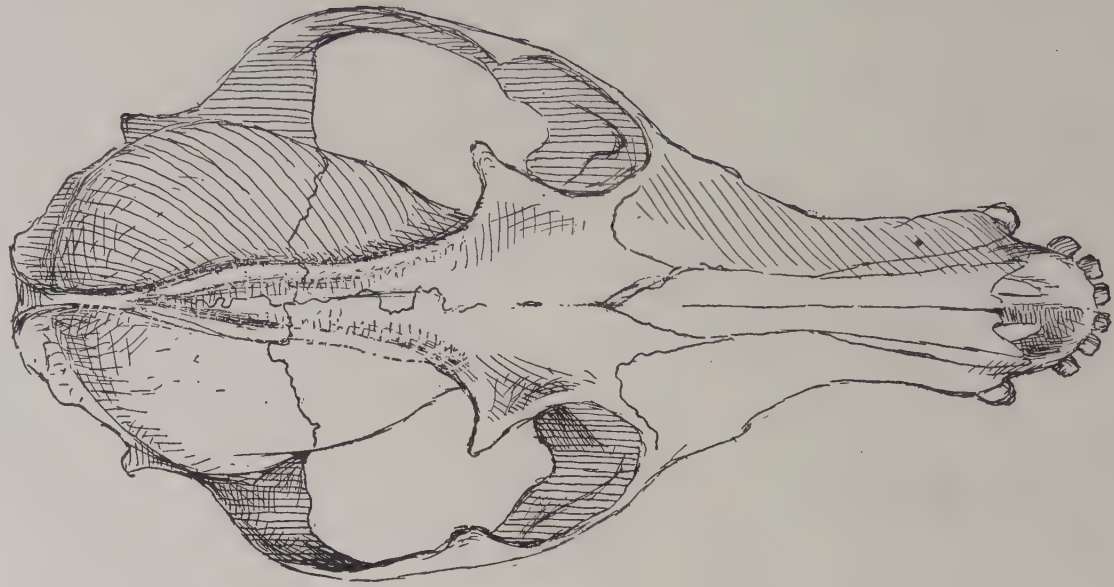

Plate Lxxxviii.

Skull of Red-fox (*fulva*) ♂ ⅓ Amer. Mus. 11066.

Lest the frontier trapper who sees the above be led into undue appreciation of his fur, it is well to remember that the fur-dealer has three great risks to face, damage in transport, damage in storage, and, above all, damage through the freaks of fashion. The intrinsic value of Silver Fox as an article of clothing is little more than that of the Red-fox, say $5 or $10 a skin. But Silver Fox is beautiful, rare, and fashionable; hence the fancy prices paid. It is always within the range of possibility that the fashion may suddenly change and the price of choicest skins drop to a fraction of the last ruling figures. The prices paid at the trading posts to-day have been fairly adjusted by keen competition; they certainly are not too low.

The lustre, fulness, and beauty of the Silver Fox fur are unique and inimitable. Its market value is so high that successful attempts are being made to breed Foxes for their pelts. As the subject is of wide interest, I reproduce later an article on Fox-farming which I wrote for *Country Life in America*, in 1905.

Haunts

The unbroken forest seems as little suited to the Red-fox as is absolute civilization. It is essentially a species of the half-open country, and always increases in the half-settled districts. It was very scarce in the days of primitive woods. I remember very well once in June, 1885, near Coboconk, Ont., seeing a Fox trot out of the woods ahead of me for 50 yards along the path, then disappear without knowing I was near. I mentioned this at a camp I came to in the evening. Two lumbermen were its total population; one had been 16 years in the Muskoka woods, the other a little less, but both said that they had never yet seen a live wild Fox in the country.

Similarly, Bachman says: "This Fox, in times gone by, was comparatively rare in Virginia, and farther south was unknown. It is now [1849] seldom or never to be met with beyond Kentucky and Tennessee."[21]

Many other writers could be cited to show that in primitive days the Red-fox was rare or even unknown in regions where now it is abundant—a fact that has given rise to the myth that the Red-fox is not a native of America, but a European introduction.

There seem to be two grand tests of a species so widely dispersed. First, can it stand the winter in the North; second, can it stand the insects in the South? The Fox has solved the first riddle. Its ideal home and surroundings, its centre of abundance, is the great varied farming region of southern New England, New York, Pennsylvania, New Jersey, Maryland, southern Ontario, and Michigan. Here are man-made supplies for winter

[21] Q. N. A., II 264.

stores, fences enough to bother the Dogs and riders, broken country for cover, and dangers enough to serve as tonic and a source of exhilarating exercise and amusement. In this region the Fox is abundant, to-day probably more so than at any other time of its history—a fact that is illustrated, if not exactly pictured, by the New Jersey hunt already cited.

Let us remember that every part of the fur-country, settled or wild, is more or less covered by the expert trappers. Therefore, the fur-returns are a fair measure of the fur-bearing population. With this in mind, the Canadian Government fur-returns for 1921–22 give us surprising light on the number and haunts of the Fox. In the table the facts are set forth. They show clearly that the greatest number of Foxes are found, not in the largest Provinces, but in those with the largest settled areas, the ratios being:

	Sq. Mi. of Total Area	*Sq. Mi. of Settled Area*
British Columbia	1 Fox to 400 sq. mi.	1 Fox to $2\frac{7}{8}$ sq. mi.
Manitoba	1 " " 126 " "	1 " " $7\frac{1}{2}$ " "
Alberta	1 " " 125 " "	1 " " $2\frac{1}{2}$ " "
Saskatchewan	1 " " $83\frac{1}{3}$ " "	1 " " 2 " "
Quebec	1 " " 50 " "	1 " " $3\frac{1}{2}$ " "
Nova Scotia	1 " " 21 " "	1 " " 8 " "
Ontario	1 " " 15 " "	1 " " 2 " "
New Brunswick	1 " " 14 " "	1 " " $3\frac{1}{2}$ " "

On this, I have omitted Prince Edward's Island with its 2,000 square miles, all of it cultivated, and its exports of only 38 Foxes, The case is not safe as datum, since they do not market the Foxes, but keep them for the numerous fur-ranches.

His Love for His Homeland

The tenacity with which the Fox holds to a fat and ancient range in spite of man-danger multiplied to the *n*th degree is remarked by many observers. In 1892 there was a Fox family living in the ravine just north of Bloor Street, Toronto, Ont. They continued there for one or two seasons, although the place was within the city limits and surrounded by houses. They were many times seen. Their location saved them from hunters and guns. Dogs, their only grave danger, they eluded by use of the interminable fences. Going through a hen-hole was an adequate answer to pursuit by big Dogs, and scaling a 6-foot board fence easily baffled any small Dogs. I saw them once or twice, and had plentiful evidence of their cleverness in raiding the surrounding chicken roosts. So far as known, they lived happily for ever after and died of old age.

In my home at Cos Cob, Conn., 1906–12, a pair of Foxes quartered

themselves on my duck preserve. A 10-foot fence kept all Dogs away. There were over 100 acres in the preserve, so the Foxes lived a merry life.

In Milbank Park, 300 acres, in the centre of Greenwich, Conn., a pair of Foxes established themselves and for a time seemed to have every blessing of life in abundance. The owner had great flocks of waterfowl on the ornamental waters, no Dogs were admitted, guns and rifles were unknown. An old Woodchuck den in a rocky ledge supplied a perfect home beyond the reach of pick or shovel.

However, the owner got tired of feeding these poachers on ten-dollar ducks, and showed that, though beyond the possibility of being dug out, the Foxes were not beyond the reach of a stick of dynamite, with one of which he cut short the career of the whole family in their cave.

Around my Greenwich home, only 2 miles from the town, and with a well-be-dogged house every quarter mile, the Foxes abound. I hear them nearly every night or see their traces every morning. Many a duck have they taken from my stock, but I gladly forgive them. It is worth more to me to hear that squalling night-cry under my window in the darkness than to be the overfed owner of many fat, stupid table ducks.

Such experiences incline me to give full credence to the following note: "Some years ago a correspondent sent us a list of the wild creatures to be found within the limits of the city of Boston, and among these, Foxes were named. A recent issue of the *Transcript* of that city says that 7 baby Foxes have been taken from a den on the Newton side of the Charles River below Norumbega Park."[22]

Non-migratory

Unlike the White Fox, the Red-fox makes no migratory movement, so far as known. The fact that they are much more often seen in fall is due, of course, to the fact that the Fox population is then at its maximum; the families are breaking up and the young are running about in search of the best hunting grounds. Their habits change but little, however, with the changing season.

The Wild Night-cry

This species uses the smell-telephone much less, I think, than the Wolf does. (See "Wolf.") Its principal method of intercommunication is doubtless by the voice. It has a short bark followed by a little squall like "*yap-yurr.*" That is the sound oftenest uttered, but it has also a long yell and two or three different yowls or screeches as well as softer *churr-churrs*

[22] Forest & Stream, May 15, 1909, p. 773.

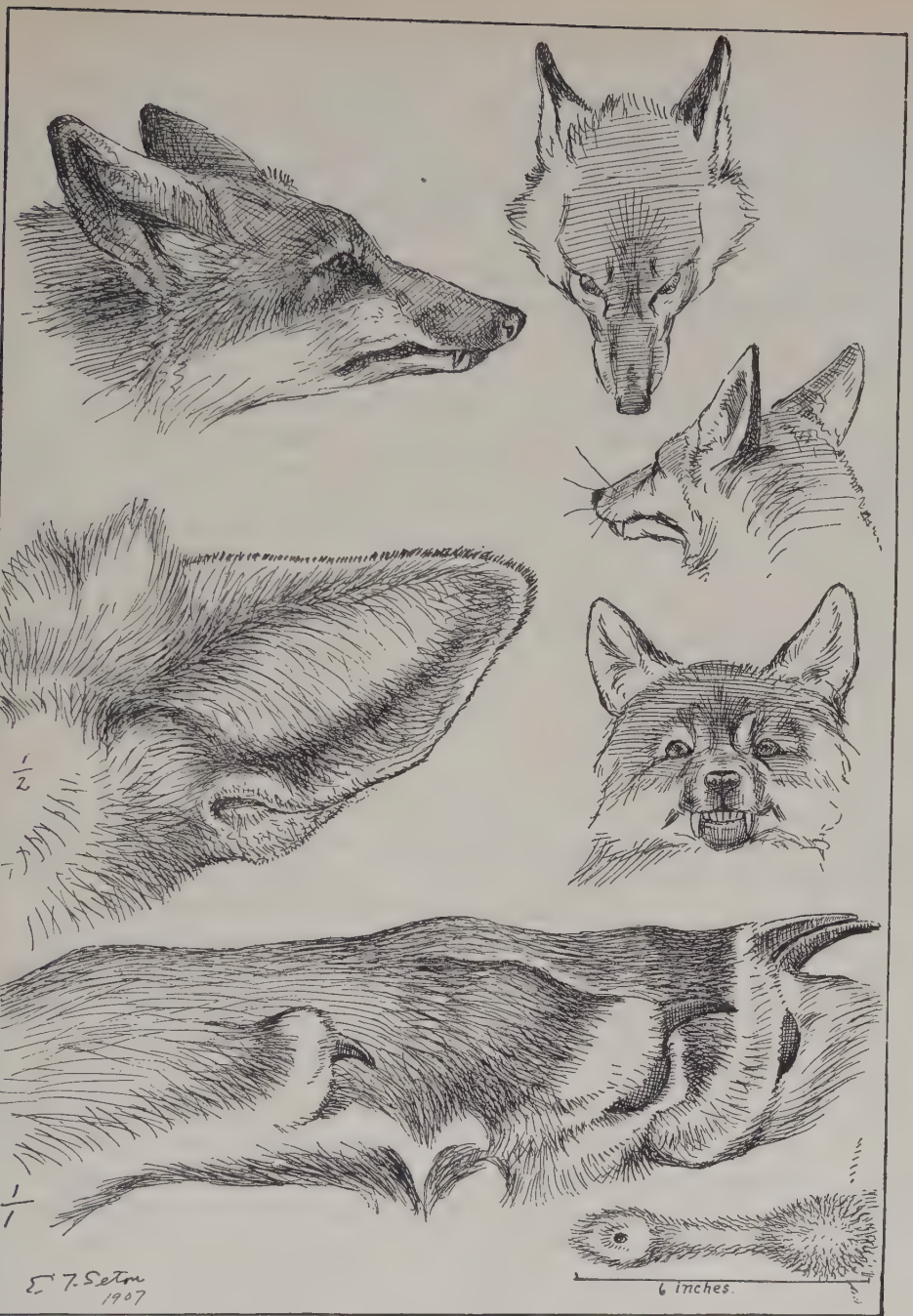

Plate LXXXIX. Details of ♂ Redfox taken on Great Slave River Alta. 4 Oct. 1907., E.T.S.

that doubtless have different meanings to its kind. The voice of the male is notably heavier and coarser than that of his mate.

In the pairing season the she-Fox utters a very characteristic shrill squall. The reply of the male is usually two or three short barks. In autumn, I have several times known a Fox to come at night around the campfire and "yap" in the manner of a Coyote.

This yapping of the Fox is nearly always at night, but Will W. Christman of Delanson, N. Y., writing to John Burroughs on "The Ways of Foxes," says: "Have you ever heard a Fox bark in the daytime? One winter morning I saw one, a quarter of a mile away, sounding his 'wood-notes wild.' Again, while ploughing last November, I heard one barking about 4 o'clock in the afternoon. One night I heard one barking in the pasture lot. I took my gun and hurried out to interview him. They had been in the habit of crossing the creek about 100 yards from the barn, so I selected this place for our meeting. While getting into position I could hear him barking at intervals, each time a little nearer. There was a few inches of light snow, but no moon, so that it was rather hard to pick out his Foxship from the few small evergreens that grew near the ford. I stood behind a large elm, steadying my gun against the trunk and covering the road I felt sure he would take, perhaps 75 yards away. I did not have to wait. He came out of the protecting evergreens almost as soon as I was ready. It was too dark to take aim, but when I felt sure I had him covered I let go. It was such an unusual time for an ambush that he was undoubtedly the most surprised Fox recorded in these annals. He paused just long enough to locate his enemy and disappeared in the neighbouring woods."[23]

The Fox has, however, one or two remarkable calls for unusual occasions. For example, Bachman says that in one instance some peculiar and startling cries supposed to be uttered by a Cougar were ascertained "to proceed from a Red-fox which was killed in the hunt got up for the purpose of killing the Cougar."[24]

A still more thrilling sound is ascribed to the Fox by Samuel Scoville, Jr., as follows. He and his naturalist companions were prowling in the Barrens of New Jersey one October night. "Suddenly the stillness was broken," he says, "by a perfectly appalling scream. Although I recognized what it was, my muscles jerked and twitched at the sound, and when it was repeated, my companion, even though a veteran naturalist, gripped me so tightly that his finger-prints showed black on my arm the next morning. It was the scream of a Fox, probably the most sinister, unearthly wild-

[23] Forest & Stream, May 25, 1907, p. 811.

[24] Q. N. A., II, p. 312.

animal note that can be heard in North America. The howl of the Wolf and the screech of the Wild-cat, or Bay Lynx, are all weird sounds, to say nothing of the frightful shriek which the horned owl sometimes gives, but none of them begins to be as fearful as the scream of the dog-Fox. Usually he barks like a Dog that is just learning how, and the vixen squalls and squawks like a heron; but none of these sounds can ever be confounded with his scream, as rare and dreadful as that screech of the wounded Horse which frightened even Hawkeye and Chingachgook."[25]

Why the Great Brush?

No one can long watch a caged Fox in winter time without discerning the use to which it puts its great bushy tail. Its nose and pads are the only exposed parts, and these might easily be frost-bitten when it sleeps during severe weather. But it is always careful on lying down to draw these together, then curl the brush around them; this acts both as wrap and respirator. I have many times seen wild ones do this very thing, and am satisfied that the tail is a necessary of life to the Fox, as well as to the Squirrel and Wolf. I believe a Fox or Coyote would die before spring if turned out in the autumn without a tail.

The brush is large in proportion to the coldness of the climate. In Foxes from the Southern States it is a very meagre thing, but on the Saskatchewan and farther north, it is enormous, looking at a distance almost as large as the Fox's body, and, of course, it reaches its greatest size in the depth of winter. The coat in general is developed by cold, but not apparently to the same extent as the tail.

As elsewhere noted, this useful member serves further as a fender in fighting.

L. W. Walker was in charge of one of the Hotels in Yellowstone Park during the winter, and had ample time to observe the dozen or more Foxes that came for scraps of food. One in particular that they named "Nickle" learned to come regularly to the window for breakfast and supper, responding at once to a whistle or a call by name at any time.

"The other Foxes," he writes, "are familiar with the delicacies with which Mr. Nickle daily gorges himself, and watch him with jealous eyes. Oftentimes Nickle retreats a few yards from the window, to munch his morsel, when, like a streak of light, from behind some convenient snow-bank, springs another of his kind and pounces upon him. Then commences a battle, and a most ludicrous one. After the first jump, they turn their brushes toward each other, open their mouths, showing their teeth, and

[25] Samuel Scoville, Jr.: Fourways, Century Magazine, Sept., 1923, p. 775.

advance snarling, watching carefully over their shoulders, as their rear is turned to the enemy. They make the funniest bounds imaginable; first one way and then the other, as if made of rubber, frisking their brushes in each other's faces, or using them for a guard as a trained pugilist wards off any sudden blow his adversary may deliver. The Foxes quickly turn from rear to front and strike or bite until one or the other is knocked over, and Mr. Nickle saves or relinquishes his bone according as he is more or less adroit than his enemy.

"Since suffering one or two defeats, he has become very cunning, and now eats his lunches so close to the window that the others dare not come to him."[26]

But the brush has also its disadvantage. Dunham Wheeler, of New York, tells me that once while hunting a Fox in the Adirondacks, during early spring, when the snow was deepest and wet, he saw the creature coming toward him; it stopped and seemed to worry its tail; again it did this when nearer. He shot the Fox and found that its tail was heavy with water, and when the crafty one stopped, it had been to wring or stamp out the water with its front paws and so reduce the heavy burden of the water-logged brush.

Speed

The best speed of an average Fox for 1 mile is at the rate of about 26 miles an hour. This is faster than a Coyote but slower than a Jackrabbit.

A. S. Barton, of Boissevain, Man., sends me an interesting item on this head. "Once," he says, "while mounted on a fast saddle-horse, I ran a Fox for half a mile, both of us doing our best, but it was an even race all the way. I should say the Horse was doing 2-minute time, as his record was 1.51 for the mile." Therefore this Fox was running at the rate of 30 miles an hour. Doubtless it was his highest speed, and he must have been an exceptional Fox.

Bachman, always enthusiastic on wild sport and animal powers, wrote in evident reference to a discussion:

"In order to ascertain whether the speed of the Red-fox was as great in the South as in the colder regions of the North, several gentlemen near Augusta, in the winter of 1844, resolved to test the question by a regular Fox chase. They congregated to the number of 30, with 100 hounds, many of them imported Dogs, and all in fine running order. They started a Fox at 2 o'clock on a moonlight morning. He took to a pretty open country on the west bank of the Savannah River. A number of gentlemen were

[26] Recreation, May, 1897, p. 339.

mounted on fleet Horses. Mr. Beile rode in succession 3 Horses during the chase, 2 of which were good hunters. The pursuit of the flying beast was kept up till 3 o'clock in the afternoon, having continued 13 hours, when the Horses and the whole pack of hounds were broken down, and the hunt was abandoned."[27]

I can hardly forgive Bachman for not adding a triumphant "and thus after running over 100 miles, the wonderful creature made good his escape."

Later on, I give an account of a hunt in which the heroic Fox ran 1½ days without ceasing, virtually destroyed the pack that followed him, and died at the finish with the last survivor of the hounds.

[27] Q. N. A., II, p. 270.

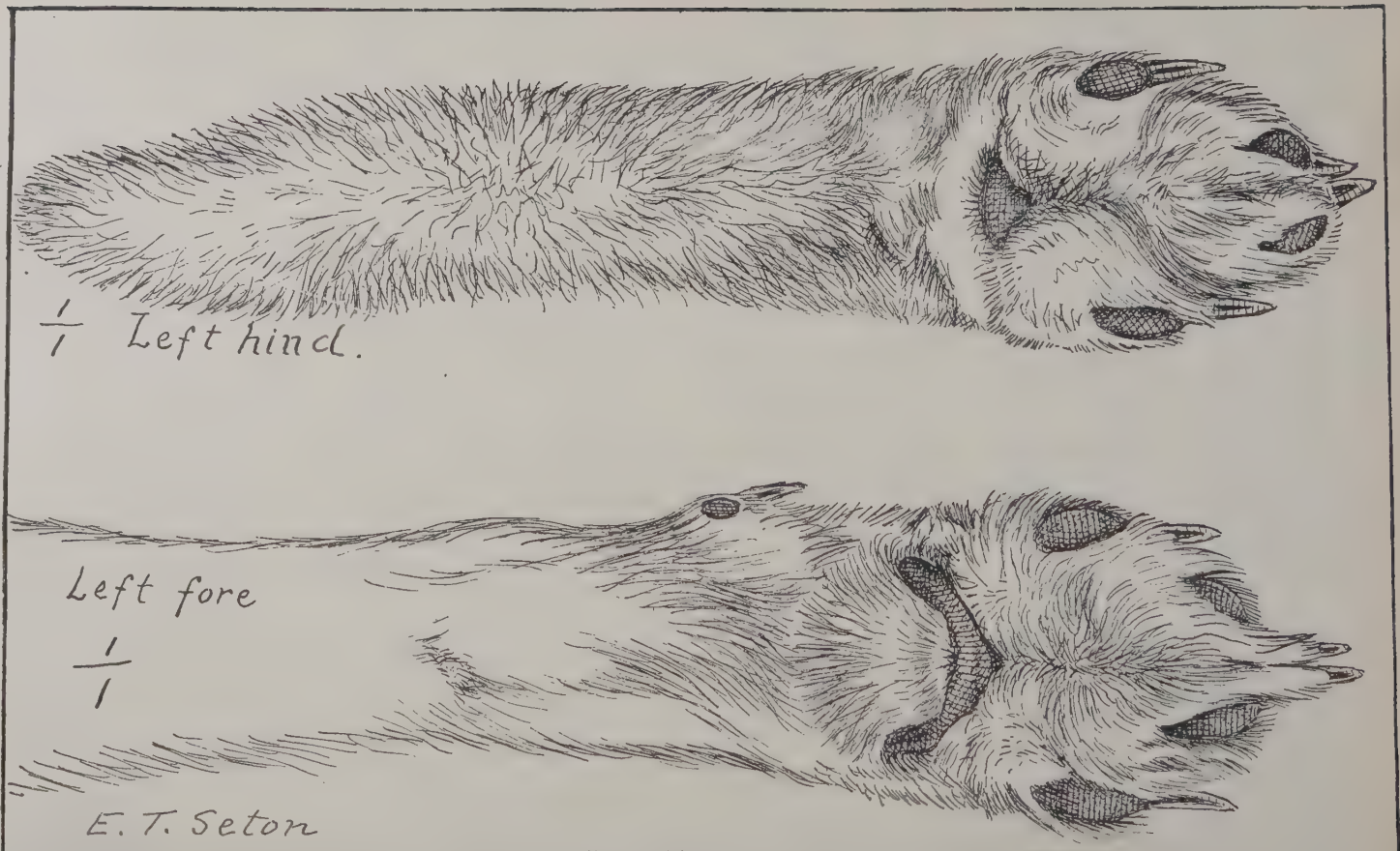

Plate Xc. Feet of Red fox ♂ Great Slave R. Oct. 4, 1907.

Food

This animal is popularly supposed to subsist on Rabbits, poultry, and game birds. I have known it to kill each of these, but I believe that Mice form the largest part of its diet.

Mouse-hunting. The Fox spends so much time catching Mice that he is often seen in the act. Many times, by means of a telescope, I have observed one in broad daylight, while he secured his easy prey. Selecting some well-known Mouse haunt, usually a grassy hollow, he advances quietly, looking this way and that for the slightest rustle, alert to the finest sound, tiptoeing, even standing on his hind legs to see more clearly over the grass. A squeak, or perhaps the movement of the grass-tops, catches his attention and he springs for the root of the long, vibrating spear, slaying with a nip the Mouse that he probably does not see, then separates it later from the grass, to chew and swallow the morsel in a few seconds. His movements are full of elegance and his habits of graceful poses. I know of no prettier sight than a Royal Fox, red and rich in his sleek new coat with its black velvet facings and its trimmings of silver and gold, as he hunts for Mice among the rank foliage and flowers of a prairie-hollow in Manitoba.

A similar scene has been described to me by W. R. Hine. In this case, however, the Fox was not a common yellow one, but a superb silver-black.

In the October of 1887, while out shooting grouse on the Emerson Trail, 2 miles south of Winnipeg, he saw a large Black Fox on the open prairie, some 500 yards away. It was catching Mice, and paid little heed to him as he drove by in a rig with his father and brother. Hine whistled heedlessly and passed the mouser at 100-yard distance, taking care not to go straight toward it. At length its suspicions were aroused and it crouched; although the grass was but 6 inches high, it sank so low that he could see nothing but its black ears. The gunner drove in a circle ever nearer without alarming it, except that the Fox crouched yet lower, and at 50 yards Hine shot him with a charge of heavy shot. Although the time was October, the pelt was already prime.

The squeak of a Mouse has such a charm for the Fox that even a poor imitation made by sucking the back of the hand will bring him at a run toward the squeaker. Though in the midst of a hard run, he will jump at

the sound of a Mouse squeak and, if the Dogs be not too close, will turn for an instant to a statue, then try to locate that sound of sweetest promise.

An excellent illustration of this is found in the remarks of an old fox-hunter (Daphne) who writes from Jersey City, N. J. In discoursing on "Still-hunting Foxes," he says:

"I found the best locality for carrying it on was low-lying fields or pastures, remote from farmhouses. Here at daybreak you would find them hunting catlike for the luckless Mouse, for which they had a greedy appetite. I would place a composition on my boots, which is a great attraction for the Fox, repair to what I know to be a hunting ground for them, walk in a circle on the windward side of some object, a stump, tree, or cluster of bushes, secrete myself there and await the animal's appearance. Sometimes I waited in vain, but a sportsman must have patience and it will prove its own reward. The Fox would strike this trail and follow it past my place of concealment. I have been able on many occasions to call them within a few rods of my hiding place by imitating the sharp squeak of the Mouse. Be careful to have the wind blowing toward you, or else they will scent you and run away.

"I stood as silent as a tree one morning and watched a Fox catch 7 Mice in a few minutes, and at last when near enough I pulled the trigger and the game was mine. When I approached and picked up his lordship, a Mouse dropped from his mouth, and upon examination I found the entire 7 Mice in his mouth."[28]

Another mouse-hunting episode I gladly give, although, unlike the foregoing, it has already been gathered into "book form." This is by W. E. Cram, a field man so keen and original that his product is my ample justification.

"A Fox's ears," he says, "are wonderfully keen, and he depends upon them much more than upon his eyesight, both in hunting and in avoiding his enemies.

"This morning, Jan. 31, 1902, a little before noon, I was crossing an open clayey pasture, when I heard a crow in the distance give the call which means a Fox in sight. Presently I saw Reynard himself trotting along at the edge of a pine grove; when he passed behind a thick clump I ran forward a little way and stopped, watching an opening among the trees where I felt pretty certain he would show himself again. Sure enough, in a very few minutes he appeared and trotted out across the meadows.

"He was at least 150 yards away and going from me, but the air was still and I squeaked like a Meadow-mouse, hoping that perhaps his big ears

[28] Forest & Stream, Aug. 21, 1890, p. 89.

Plate XCI. Fox studies.
by E T Seton.

might catch the sound even at that distance, though the sharpest human ears could scarcely have heard so faint a noise at a tenth part of the distance.

"Yet the Fox heard it and stopped instantly, and turning, came leaping lightly over the hassocks in my direction. Every few rods he stopped, cocking his ears above the sere meadow-grass to listen; then I would squeak, a little lower each time, and instantly catching the direction of the sound, he would come trotting toward me, using greater caution than at first, and keeping under cover of the hassocks as if to avoid frightening his game. When he got within 50 yards there were no more hassocks or bunches of grass for concealment, only the smooth, sheep-trimmed sod where I crouched in plain sight, with my back to what little sun shone through the flecked and mottled clouds that covered the sky. He looked at me sharply as if mistrusting something, and if I had moved either my head or hand the fraction of an inch, he would have been off like an arrow to the woods. But I held myself perfectly motionless, and when the expression of his shrewd gray face and the set of his ears showed that his suspicions were subsiding, I squeaked once more, very faintly, calling him at last almost up to me. But now he saw that there was certainly something wrong, and that I was neither a rock or stump or even an old scarecrow; so, to make sure, he circled around to get the wind of me, trusting more to his nostrils than to his eyesight.

"He was a large male, gray about the face and cheeks, and perfectly black on his legs and the backs of his ears. His tail was a superb white-tipped brush, well grizzled with black. When I spoke to him he sprang into the air and went bounding away to the woods, then stopped and looked back at me for a few seconds before disappearing among the trees."[29]

A Change of Diet. Nor are Mice the smallest prey on the Fox's list. Bachman says: "We have watched it catching crickets in an open field near an old stone wall. It is diverting to witness this—the animal leaps about and whirls round so quickly as to be able to put his foot on the insect, and then gets hold of it with his mouth; we did not see him snap at them; his movements reminded us of a kitten playing with a Mouse."[30]

The European Fox has been studied longer and more minutely than ours, and certain remarks on its food habits made by Doctor Brehm may be accepted as foreshadowing observations yet to be made on our own species. "The Fox," he says, "preys on all animals from a young Roe to a beetle, but principally Mice. . . . He catches grasshoppers, maybugs and their grubs, rain-worms, etc., or gathers sweet pears, grapes, or berries."[31]

[29] Am. Anim., pp. 271–72.

[30] Q. N. A., II, p. 268.

[31] Tierleben, Säugethiere, III, 1915, p. 172.

PLATE CV.—A MOTHER FOX AND HER FAMILY

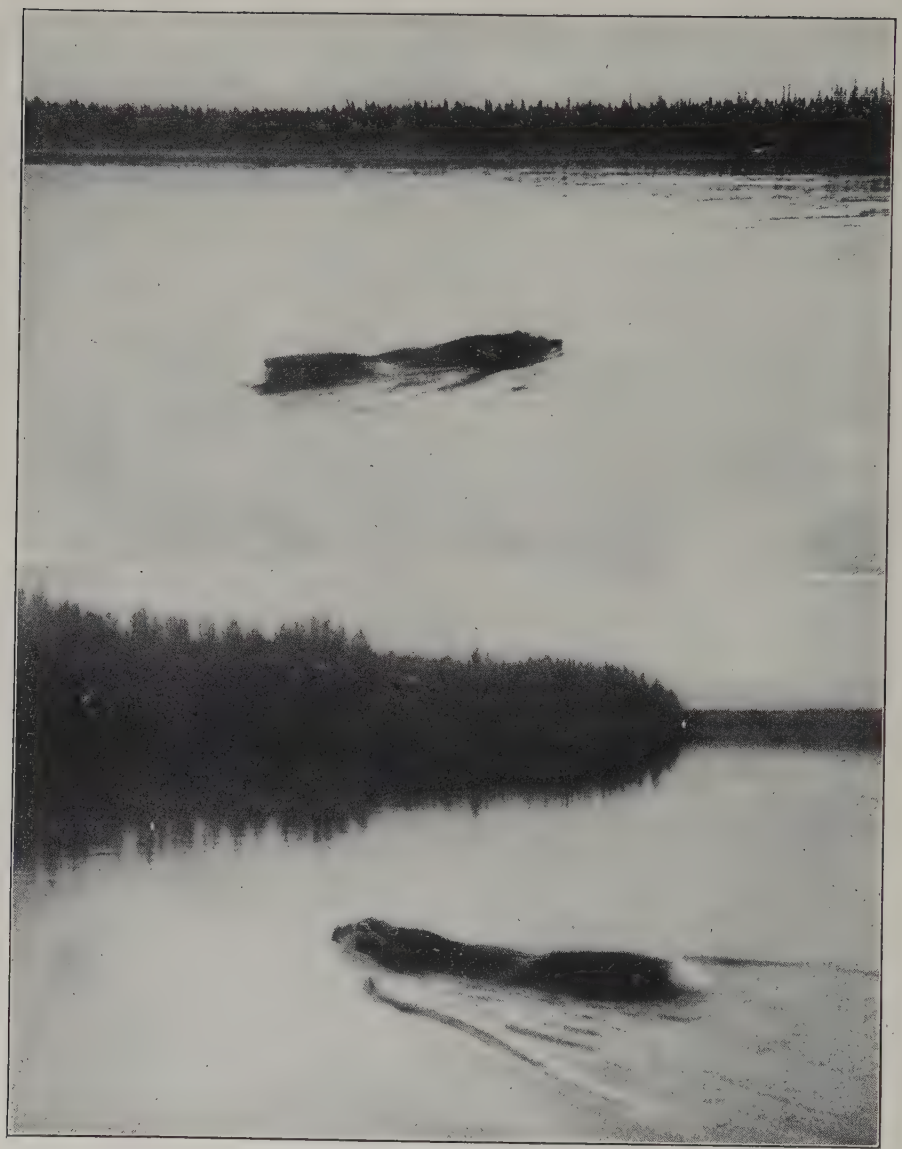

PLATE CVI.—FOX SWIMMING
Photographs by E. T. Seton, Great Slave River, Oct. 4, 1907

Our ranch-raised Foxes commonly eat bread, biscuit, and fruit, and it comes as a surprise when we find fruit and vegetables listed in the wild Fox's diet.

During my journey through the Far North in 1907, as I came up Athabaska River on October 26th, the dung of Coyotes was full of seeds of berries, as also was that of the Foxes.

Robert C. Murphy, of the American Museum of Nat. History, sends me the following. He knew of "a Fox which was killed by an automobile on Long Island in August, 1920. Its body was very distended, and, when it was cut open, a purple mass of blueberries, apparently quarts of them, gushed out! On the sand-pits, during beach-plum season, Fox tracks can often be found, winding in and out among the shrubs, and the Naturalist suspects that Foxes are no less fond of this native fruit than his own shepherd Dog has always proved herself to be."[32]

One way in which the Red-one may get a sufficiency of vegetable food is suggested by this incident:

On Jan. 21, 1920, I followed a large Fox through my Greenwich woods, where he had been hunting in leisurely fashion. On coming to a high stone wall, he had leaped up on it, and there dropped dung. The four pellets were rather small, soft, smooth, and of a dull green colour, but there was no sign of fruit or hair on the outside. I sent the mass to the Biological Survey for examination and received the following report: "The pellets were composed of about 90 per cent. Mouse fur, mainly of *Microtus pennsylvanicus*. There were a few bones of the Mice, one small feather of a bird, probably a chicken, and some skin and seeds of apples. The green colour over the outside and to some extent throughout the felted mass is undoubtedly from the stomach contents of the *Microtus*, which would be mainly grass. I should think from the amount of fur, that 10 or a dozen Mice were represented in this lot." As there was about two feet of snow on the level, one wonders how he got at the Mice.

Farmer *vs.* Fox

While I pose as judge of the Fox's case, and pretend to balance fairly the evidence for and against him in the famous legal action *Farmer* vs. *Fox*, I must confess to a strong desire to exonerate the culprit at the bar, to secure by any means his acquittal. For I have known him all my life, and learned to love him; and I have known the farmer all my life, and do not love him. Even when the Fox was stealing all my ducks, I only shook my finger at him

[32] N. Y. Evening Post, Nov. 11, 1920.

and said I must lock up my ducks nights—which did not help much, for the Fox learned my ways and adopted daytime tactics to meet them.

I am stressing hard all the bug-eating, mouse-eating, grass-eating propensities he manifests, and soft-pedalling his positive destruction of stock and game. Yet for the looks of it, I must record some of the damning evidence.

E. P. Robinson, of Packer, Conn., testifies: "One of my Fox-hunting acquaintances who tracked a Fox for some miles on a recent fresh snow to his burrow and dug him out, says he caught and ate 4 ruffed grouse during this short trip. On questioning him carefully, he could not be certain all 4 were caught on this trip, but had thought so at the time, yet admitted that the Fox might have caught and hid one or more of them on a previous night. Five or 6 pounds of partridge would be quite heavy feeding for even a large Fox, I would say, and of a grade not indulged in very freely by some men of fortune. This man's experience is in accord with my own, as I have often seen where Foxes have caught quail, grouse, and Rabbits, but some hunters think Foxes not very destructive of our game birds and animals."[33]

As an offset to this, "Stanstead" [N. P. Leach of Swanton, Vt.], an old fox-hunter, states: "I have hunted Foxes for nearly threescore years, and have yet to see where they have ever caught or killed a domestic fowl or a ruffed grouse, or young lamb; though I have in the winter often seen where they have tried to catch grouse that were roosting under the snow, but never saw where they had succeeded in catching one. I have very often seen where they have caught our common northern Hare, and only once have I ever seen them in the vicinity of the numerous flocks of geese and turkeys that are roaming about our fields."[34]

However, Joseph S. Osborne, of East Hampton, N. Y., writes me: "A neighbour of mine was driving with her husband from an outlying village to their place, in the morning, July 3, 1910, when they noticed running along the road, through the small wood or bushes, some animal of a yellowish colour, and thought at first to be a Dog, but later proved to be a Fox. The creature at first seemed to have a large head, and was hence thought to be a Dog, until, on nearer approach, it dropped 3 chickens from its mouth and ran into the bushes. The chickens were, perhaps, 6 weeks old, at a guess, and were, of course, dead. After the wagon and occupants passed, the Fox came out to the road, gathered its prey again, and disappeared once more."

Now lest our farmers score a point here, let me quote again from Cram. "It is only recently that I have come to realize what persistent Woodchuck

[33] Forest & Stream, Feb. 24, 1912, p. 239.

[34] As above, Sept. 1, 1906, p. 333.

hunters Foxes really are. I find that the shrill alarm cry of the Woodchuck, heard echoing back and forth across the pasture-land, is a pretty reliable foretelling of the approach of a Fox.

"The appearance of a man or Dog causes no such general alarm among them."[35]

B. H. Warren has collected much data concerning Fox food in Pennsylvania, and writes: "Mr. J. E. Hodel, of Allegheny County, says that he and James Henderson blamed a Fox for stealing their poultry; they sought for her den and dug her out. It was an old she-Fox, and they found several bushels of bones of lambs, Pigs, ducks, geese, turkeys in an ante-chamber or dining room, by side of den.

"Mr. Geo. Murphy, farmer, Armstrong County, tells me that several years ago, a drover with Sheep and lambs was passing his place, and the lambs gave out and were left there a day; during that time a large Fox paid them a visit, caught and killed one, and then perched itself on the fence to bask in the sunshine. He went to get a gun to kill it, but when he came back it had taken its prey and left. Not long after a sow had a litter of Pigs in the woods; he heard them making a noise one day, and went to see what was the matter. A big fight was on between the old sow and the Fox; the Fox would run at the sow like a Dog, and then the sow would run at the Fox to drive it away from the Pigs that were huddled in the nest; this was repeated several times until the Fox got the sow real mad and she made at the Fox and ran it several yards from the Pigs. The Fox then, quick as speed would let it, bounded round the sow into the nest, grabbed a Pig in its mouth and was gone before the sow could get back to the nest. He had to take the sow and Pigs home to keep the rest from being stolen."[36]

But he credits the Fox with power and turpitude to prey on much more important animals, as follows: "The fact that they will kill young fawns is beyond dispute and shows that the doe has in the artful Fox, as well as in the sneaking Wild-cat, foes which need constant watching. If it was customary for crafty and sagacious Foxes to hunt in packs, as Wolves do, there unquestionably would be a much greater paucity of Virginia Deer than at present exists in Pennsylvania. I have in my museum a Blackbear, about as big as a large House-cat, which was obtained from a woodsman who said he found it at a Red-fox's den."[37]

A final note, a fair summing up, is offered by Dr. A. K. Fisher as follows: "The Fox, from its occasional misdeeds, is looked upon by the majority

[35] Am. Anim., p. 267.

[36] Enemies of Poultry, p. 384.

[37] As above, p. 381.

of mankind as a deep-dyed villain that devotes its entire life to robbery, and derives all its forage from the chicken yard or duck pen. As a matter of fact, even in localities where Foxes are abundant, it is comparatively rare that poultry is destroyed by them. On all well-regulated farms, chickens are housed at night, and the Fox necessarily turns his attention to Field-mice, Rabbits, Ground-squirrels, and insects, such as grasshoppers, crickets, and May beetles, to the great benefit of the farmer. Although it is true that the Fox destroys a considerable number of birds, yet a ruffed grouse has been known to rear its young within 100 feet of a Fox den, and the tracks of the young birds have repeatedly been seen on the fresh earth before the entrance. Among the food brought to the young of this litter and left outside were Rabbits, Mice, and a half-grown Woodchuck, but no birds of any kind."[38]

Storage Habit

Most animals of the Dog family store up food when they have more than they need. T. W. Proger writes me concerning the Fox (*Vulpes vulpes*) in Wales, that "it usually buries surplus food. These caches it returns to infallibly. I think it probable that the Vixen stores up food as her time draws near, so as to have plenty to eat while she is unable to hunt. I do not think one Fox would touch a cache belonging to another unless hard pressed. They certainly never forget the place, though I do not believe the story that they mark it well by urination.

"A cock pheasant killed by a Fox and cached for a week in cool beech leaves is considered by poachers the finest eating on earth."

Similarly, from all parts of America, we are getting observations on the storage habits of the Fox.

On the fur farm at Dover, Me., the Red-foxes habitually bury food. They watch near the place and are ready to fight any other Fox trying to appropriate the store. If it is interfered with by man, they bury it elsewhere. They return to it as soon as hungry, and if there is more than they need, they re-cache the remainder.

In the den described by G. L. Fordyce was a large separate compartment for stores. In it he found 2 lambs, a ruffed grouse, a Cottontail Rabbit, and a Muskrat, all perfectly fresh, and with the exception of one Lamb, they had not been eaten at all. The Muskrat was not injured in any way by the old Fox, the only marks on the body being where she had crushed its back in killing it. He found this out in removing the skin, which he afterward sold.

[38] Yearbook, 1908, p. 190.

B. R. Ross credits the northern Fox with the highest kind of storage. He says: "When a Fox finds a piece of meat or a fish, he almost invariably hides it, and returns to eat it at some future time. I have remarked this trait even in cubs which I have reared in confinement, and which used, previous to eating, to dig holes in the snow to bury their food, pushing the snow with their noses to cover it. During the commencement of summer he will lay up a store of the eggs of the wild-fowl for his winter consumption. These he deposits in holes dug in the sandbars of the river, or in beds of moss, and at the expiration of several months will, when hard pressed by want, visit his caches. Even when there are several feet of snow, he will readily distinguish the place by scenting his urine, with which a Fox usually sprinkles in a liberal manner all his secret hoards."[39]

This storage habit is asserted also by Thomas Anderson, of Fort Smith. He says that it is well known in that country that the Fox stores eggs for time of famine.

The sprinkling with urine, and incidentally with the musk of the male-womb or protometric gland (see p. 447), is the practice of most, if not all, our *Canidæ*, and is invariable with Wolf, Red-fox, and White Fox.

Dung and Tracks

Fox-dung is not an attractive study material at first, but after a few weeks' exposure to rain and sun it is dried, bleached, and purified. All fæcal matter is gone, though it retains its shape. Now it is odourless and closely resembles owl pellets.

The undigested remains of Mice, birds, etc., their skulls, feet, hair, and feathers are easily separated and distinguished. A valuable chapter on Fox food can be gathered from such examinations. Those that I have conducted go to prove that, in spite of the facts that the Fox is blacklisted by the Aubudon Society[40] and denounced as a pest by B. H. Warren,[41] there can be no doubt that by far the largest proportion of its food is Mice and, in prairie country, Ground-squirrels; so that, on the whole, I prefer to consider our American Fox a creature beneficial to agriculture.

The tracks of the Fox are known by their size and the straightness of the trail they make. The small pads are characteristic. (The pads of the European Fox are larger.) The claws usually show in the track. (See Plate XCVII.)

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[39] Fur-bearing Animals, Mack. R. Dist., Can. Nat., 1861, p. 17.

[40] The Blacklist, The Conservationist, July, 1919, p. 100.

[41] Enemies of Poultry, 1897, p. 393.

Sociability

Since the relation of mates, or of the young to the parents, is excluded in discussing sociability, we must consider the Fox but slightly a sociable animal. The only detailed cases I have of Foxes working together refer to two (probably mates) that were combining in a hunt.

The largest number of wild Foxes that I ever heard of assembled was 16. These gathered at the Hotel in the Yellowstone during winter for the sake of the food supplies. Their semi-social manœuvres are thus entertainingly described by L. W. Walker:

"At the back of the Hotel a hill rises, rather abruptly, and at times, when a pan of scraps has been set out where the Foxes can all get at it, I have watched a peculiar manœuvre of theirs. They station themselves at intervals of 30 or 40 feet and seem to act as sentinels. I have seen as many as 10 in a space of 300 feet. When thus placed, one will act as forager and will go cautiously toward the pan. He carefully eyes each window, and listens for the least noise. When the pan is reached and a scrap secured, he bounds away, up the hill, and every Fox is after him; first one having the meat and then another; tumbling over each other until it is all devoured. Then like a body of soldiers they file back to their places and another victim is appointed to do the stealing.

"The Foxes and magpies are much in one another's company; the former walking about the latter, often within a foot of his nose, scolding and waiting for anything that may be left."[42]

Amusements

This animal is not much given to social amusements, but Norton and Stevens both tell me that on their fur farms in Maine it is a common thing for the Foxes to gather on moonlight nights and chase each other about with most uproarious barking and churring that do not seem to express anything but good-will and hilarity.

Another amusement, not at all sociable but distinctly "sporty," is often noted among the suburban Foxes of Greenwich, Conn. These Foxes have little fear of the Dogs. Indeed, I have oftentimes known some self-reliant old Reynard to go about deliberately teasing the Dogs, apparently as an amusement. The following are illustrative notes from my Journal, written at Greenwich:

April 26, 1921, at night a Fox went squalling for half a mile along the far side of the lake and set all the Dogs a-barking.

[42] Recreation, May, 1897, p. 339.

Oct. 5, 1922, about 4 A.M., a Fox screeched all around the lake on the far side. It set all the Dogs barking and all the roosters crowing. The same thing took place Oct. 3d., and again on April 11th.

A still more amusing case is sent me by B. A. Eastman, the well-known sportsman of Barre, Vt. It is quite in line with some of my own experiences. He writes me, April 3, 1924, as follows:

"The hound was in pursuit and the Fox passed me out of range for a shot, running rapidly. It was in an open pasture where I could keep the Fox in view for some 400 yards. The hound was some distance behind the Fox, and in crossing a highway lost the trail and, while hunting for it, became mute. During the time, I had watched in the direction where the Fox went out of sight, and was surprised to see it coming back running rapidly, stopping and anxiously watching and listening until it again passed me, going out of sight in the direction where the hound was seeking the lost trail. A few minutes later the hound commenced to tongue, having found the lost scent, and the fox returned over the same course running faster than ever.

"At another time it was much the same, except that the Fox did not return over the same course, but came back running to high elevations, and listening, and finally nearly ran over me in its eagerness to find the hound."

My experiences with the Springfield (Ont.) Fox (1888) gave me a large idea of the Fox's sporty mind. Night after night, when I went prowling with my hound, not to hunt but to learn things, one of the Foxes that lived nearby would give the Dog a run. At first it seemed like the ordinary chances of the hunt, but I soon found that the Fox would come to meet us if we were slow or late. Several times I sat down on a log to wait and listen, with the Dog at my feet, when from the near woods sounded the tantalizing "Yap, yap" of the Fox.

Away would go the Dog in full cry, but the weather was hot and the scent poor, and soon the Dog would come back panting to lie at my feet. Within three minutes the Fox would announce his return by his yapping bark, coming nearer and barking more loudly, till the tired Dog was led off on his fool's errand once more.

This game they played several times by daylight, and I had the pleasant experience of seeing how the Dog was fooled when the Fox wanted to get rid of him.

Reynard would lay his trail along a steep sandy cutbank that bordered the river. On dry sand, the scent is at all times poor, and in this case, the

sand fell into his tracks so as apparently to destroy it altogether. At any rate, it was usually here that the Dog lost it.

On one occasion, I was hidden within 15 feet of that old dog-Fox, as he sat on his haunches to watch the Dog vainly looking for the trail on this bank, the Fox grinning to his ears as the Dog went searching about. He not only grinned, but, though quite unwinded, he uttered a loud panting noise that surely was a Fox laugh. In his eagerness to see the result of his trick-trailing, he several times stood up on his hind legs. I never had any question of a Fox's sense of humour after what I saw on those occasions.

All of this took place in June, July, and early August.

Playfulness of the Fox

Will W. Christman of Delanson, N. Y., after describing the finding of a Fox den in April, adds:

"A few days after this event, my boy and I were witnesses of a most remarkable Fox play. My youngster was starting out to get the cows late one afternoon, when I saw what I thought at first was a shepherd Dog among them, and the Cattle seemed to be taking turns at charging him. They were perhaps 250 or 300 yards away. As I looked, the Dog made an unusually nimble leap to avoid being gored and I grew suspicious. I called the youngster back and told him to go cautiously along the ridge and take a look at them from a rocky ledge where he could see without being seen. In a few minutes he returned excited and out of breath. It was a Fox, as I suspected. I took my gun and we hurried along the ridge to witness the sport, and incidentally to have a little fun ourselves at Reynard's expense. We crept up within 50 or 60 yards of them. The Fox behaved exactly like a strange Dog among the herd. When one of the cows would charge him, he would run a little way and 'side step,' then another would lower her head and take after him. The Fox apparently enjoyed the excitement, but there were 7 cows in the herd and they kept him busy dodging them. His conduct was extremely aggravating. He would sometimes stand till one almost caught him, then he would run and turn and provoke another to the chase. I tried several minutes to get a bead on him, but the cows pressed him close. Finally they separated far enough for me to take aim without endangering my Jerseys. I must have fired too soon, for he turned and gave us what I thought was a very reproachful look before he disappeared in the neighbouring hard-hack."[43]

The old fox-hunter, "Stanstead," writes: "One evening, years ago, driving in the town of Highgate near the Canada line, as I approached a

[43] The Ways of Foxes, Forest & Stream, May 25, 1907, p. 811.

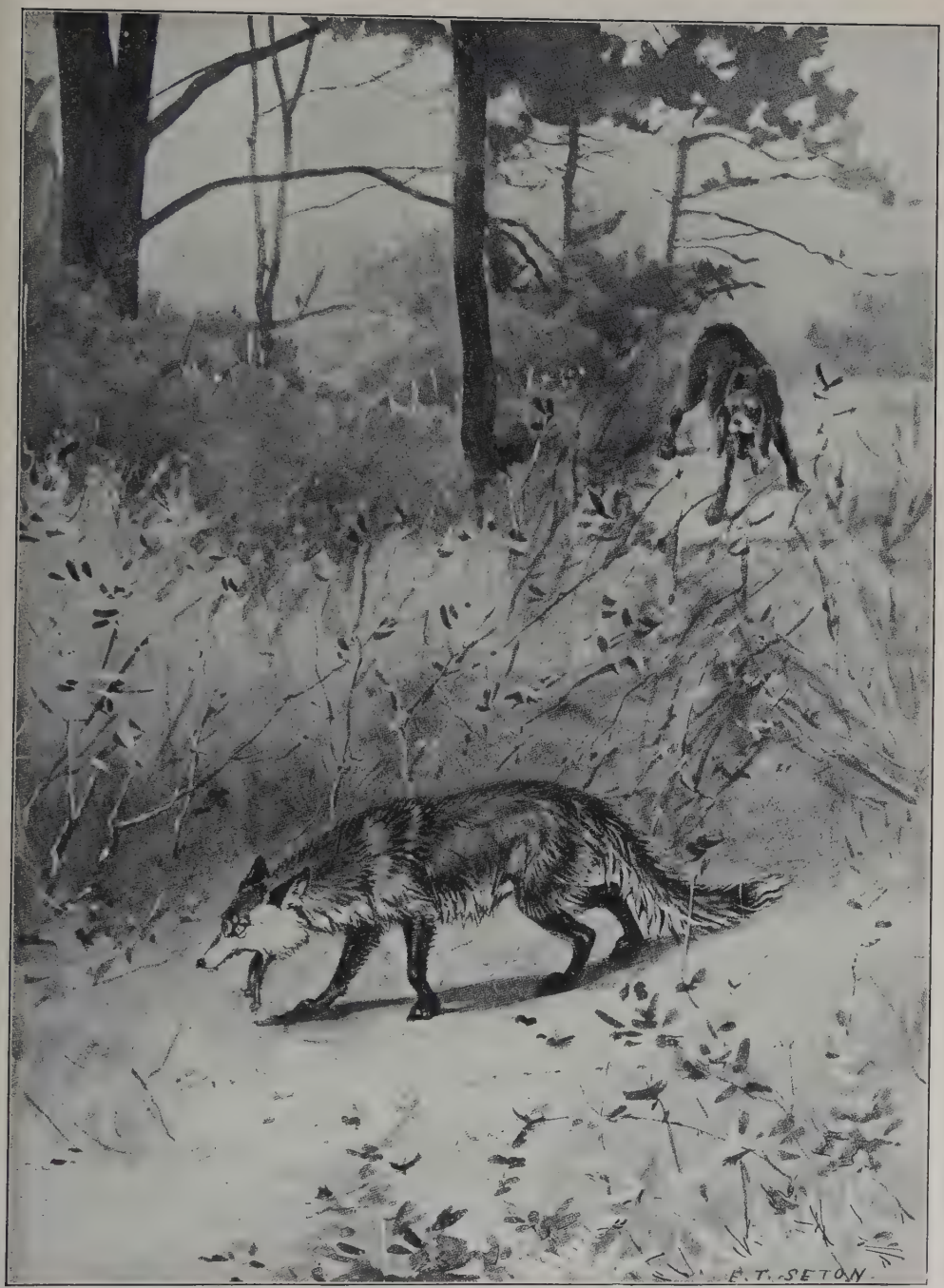
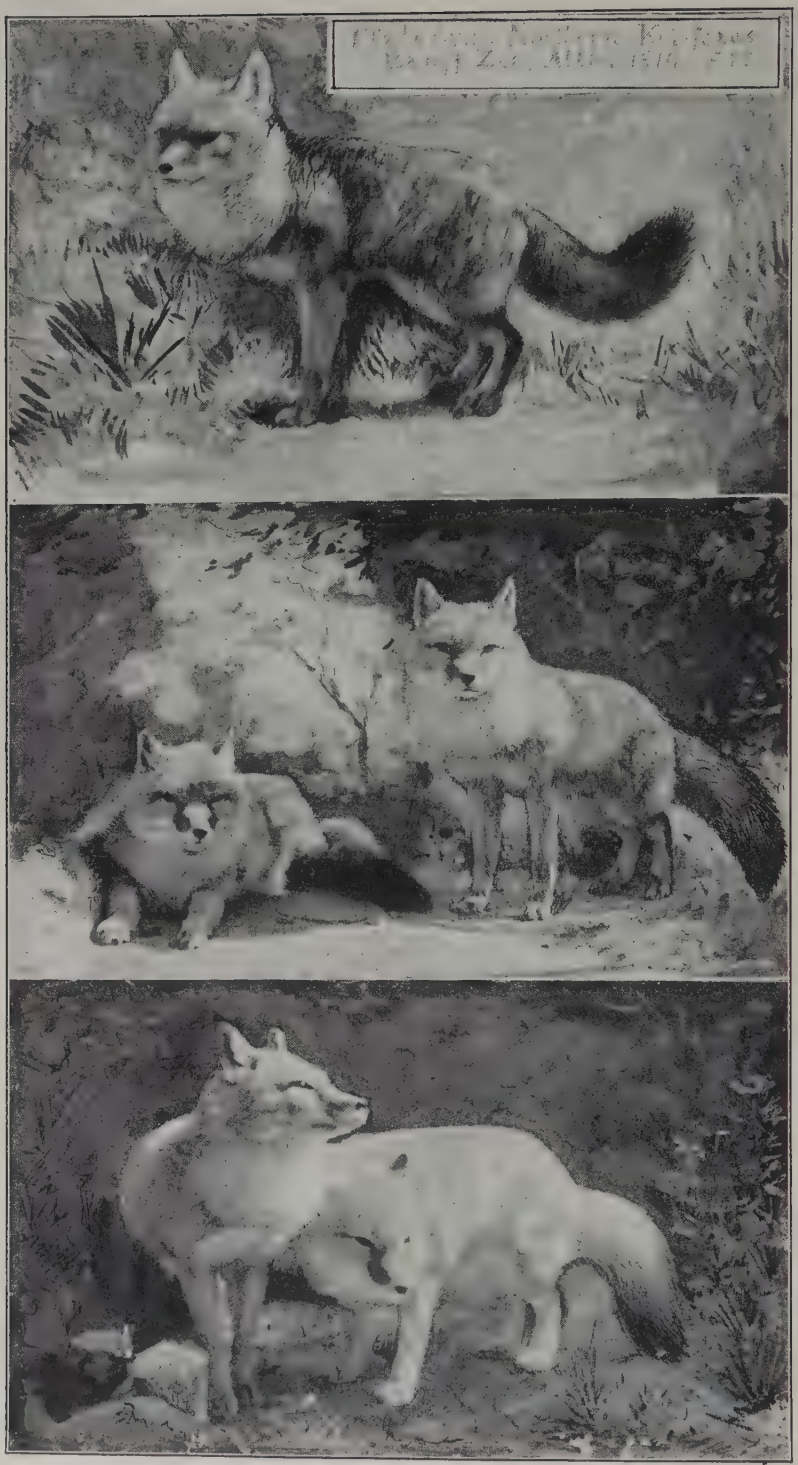


PLATE CVII.—BOSTON AND BALDY



farmhouse, I saw down in the pasture some 300 yards away, a group of Horses standing with their heads together and heels out; and near by was a flock of geese and goslings waddling up toward the house. Very soon the Horses broke ranks and with heads down started along toward the geese; and I then saw that they were following a Fox. The Fox stopped and faced the Horses, which immediately whirled with their heads together with heels out as though to repel the attacks of an enemy. The Fox then trotted along after the geese and the Horses broke ranks again and followed it. I called to the people in the house to come out and get their geese which were then near the road. The Fox heard me and, of course, bolted for the woods."[44]

In J. G. Millais' "Newfoundland" (1907, pp. 302–03) is a similar case of a Fox teasing a bull Caribou.

Friendliness of the Fox

The British Fox is well known to form occasionally a friendship with the Badger, so that they live together, at least, in the same den. Our American Fox also shows a friendliness of disposition that leads to most incongruous associations.

Charles Sheldon writes that, while Sheep-hunting in the mountains about the divide between Tustamena Lake and the Kenai River, Alaska, Sept. 18, 1912, "we saw what the Colonel said was a most remarkable and unheard-of sight. Three rams were on the side of a hill, walking along in single file, and a Cross Fox was walking with them, he jumping up and biting their faces in play, and they butting him gently along in front. When they lay down, he lay down too, and they were evidently travelling together and the best of friends. We watched them for fully 15 minutes through the glasses at about 300 yards. There was another ridge, some 200 yards farther on, and we crawled along this, but when we reached it the rams had disappeared. We saw the Fox some distance off, but could not find the Sheep again.[45]

A remarkable case of a Fox making friends of a band of Newfoundland Caribou is furnished by Donald R. Dickey.[46] On Nov. 6, 1916, he was watching on the marshes of Sandy River, Newfoundland, for the Caribou migration.

"A moment later," he says, "I was astonished to see a light-coloured Red-fox (*Vulpes deletrix* Bangs) walk out from a point of near-by timber, and zigzag casually through the middle of the band. The Caribou seemed to be on perfectly good terms with the Fox, and all in all, his actions and their

[44] Forest & Stream, Sept. 1, 1906, p. 333.

[45] Journ. Mamm., Nov., 1921, p. 234.

[46] As above, May, 1923, pp. 121–22.

response reminded me exactly of a sheep-dog working through a band of domestic animals. He wandered here and there among them, and finally drew apart and lay down on a little knoll while they fed. I was utterly at a loss to account for his having definitely sought out the band. It is possible that migrating Caribou stir up Meadow-mice in their travels, and that Foxes take advantage of this fact. I had no evidence, however, that this particular Fox was in search of food when he joined the herd. It may well have been nothing more than a coincidence, or an expression of casual curiosity on the part of the Fox, or a mere search for companionship with a non-competitive species. On the other hand, it may be that there is a definite interrelation between the travelling bands of Caribou and the local Foxes. If this is so, he may have trotted out to join the band with some definite and ulterior food-motive in his mind, such as that suggested above.

. . . . . .

"The Caribou paid no attention to the Fox beyond casting a casual glance in his direction when he passed within a few feet of their muzzles, as they fed. It seemed as though he definitely enjoyed their company, but that feeling may well have arisen in my own mind, as I watched him, without proper basis in fact. After half an hour's siesta in the midst of the herd, the Fox jumped down from his knoll and trotted back into the timber from which he had come. As he did so, a few of the hinds gazed after him curiously, but most of the animals did not even raise their heads as he moved among them."[47]

A similar experience is recorded by H. A. P. Smith of Digby, N. S. "Many years ago, and before our Caribou had vanished from Nova Scotia, an Indian companion and myself sat watching a herd of 11 Caribou that were lying in the centre of a large moss bog in the interior of this province. My rifle, a Snider, was good for about 200 yards for anything like a certain kill, and the animals sought were some 400 yards away. Looking them over with a powerful Deer-stalking telescope, I could note their every movement. All were lying down except one. This invariably was the habit of a herd; always one animal stood guard, and we used to call it the 'watchman.' From over a barren hill came a Fox. He stood and looked at the Caribou, then trotted down toward them. The 'watchman' saw him at once and turned slightly facing him; the resting herd all lay still. Right among the Caribou walked the Fox. He went from one to the other, flipping his brush from side to side, and rubbing his flank against their noses. They turned their heads slightly and seemed to enjoy the performance immensely. Perhaps I can better illustrate the instance by likening it to a domestic Cat

[47] Journ. Mamm., May, 1923, p. 122.

purring and rubbing against one's leg. That they were the best of friends there was no shadow of doubt.

"For some time the Fox played about among the animals and then, selecting a flat boulder, curled himself up right in the middle of the herd and went to sleep. It was a long way to camp and a storm was threatening, so, taking a chance, I held my snowshoes in front of me and began to crawl toward the game. The 'watchman' stamped his foot, and instantly every animal was upon its feet. The Fox ran in and out among his friends apparently giving the alarm and soon disappeared over the hill. Not so the Caribou; their fatal curiosity, as always, got the better of them. They stood facing me and then began milling about. I was wearing a pair of scarlet lumberman's socks. Turning over on my back in the snow, I kicked my feet in the air, and glancing sideways, I saw the whole 11 trotting toward me. They finally walked up to within 50 yards of my position. Sitting up, I picked out the finest pair of the lot. Nine Caribou raced away with a flurry of snow behind them, disappearing over the hill where their friend Reynard had preceded them."[48]

As illustration of the friendliness of the Fox, George L. Fordyce, of Youngstown, Ohio, sends me the following: "On one occasion when digging for a Red-fox that had been wounded and gone into a den, we dug out a pair of Skunks. Another time, when digging out some young Foxes, we found a Skunk in that den."

A still more surprising illustration is offered by Cram. He says: "To see a Fox get round the farmer's Dogs, in order to make friends with them, is one of the most astonishing revelations of character. Usually the Dogs seem hardly to know at first what to make of his advances, but the Fox is pretty certain to succeed in bringing them to his side in the end, and after that they may be seen playing together day after day.

"If, as I am sometimes tempted to believe, the Fox really works this scheme with the deliberate purpose of making it safer for him to get at the farmer's chickens, he is gifted with a degree of shrewdness beyond anything he has been credited with."[49]

Enemies

There can be no doubt that in the northern wilderness, Foxes are preyed on by Wolves, Lynxes, and Fishers. In all the prairie sections of America and Canada, the Foxes have decreased with the increase of the Coyotes, which may mean that the longer-legged Coyotes prey on the Foxes, or else

[48] Journ. Mamm., May, 1923, pp. 122–23.

[49] Am. Anim., p. 267.

that changing conditions have set up new problems of life which the Coyote has been better able to solve. The young Foxes are destroyed by every evil beast that can find them, as well as by most of the larger birds of prey.

The killing of a Fox by an eagle was witnessed near Estevan, Sask., and fully described by W. M— in *Forest & Stream*, Feb. 8, 1896, p. 114. The eagle was the aggressor, and the Fox, being on the open prairie, had no chance to seek cover. The Fox was probably of the race *regalis*.

Since the Skunk is a rival for the same foods, it may be considered an enemy of the Fox tribe. But most individual Foxes have learned to let the Skunks alone.

A curious illustration is afforded by L. W. Walker who had charge of the Yellowstone Hotel to which Foxes and Skunks came for food scraps in starvation time—that is, snow time. The Fox in question was named "Nickle." "A few evenings since, 2 Skunks were holding a hot debate over the possession of a piece of meat thrown out for the Fox. The 'Nickle' stood within a few feet of them, watching the quarrel, but recognizing their peculiar strength, was wise enough not to interfere. He waited patiently until they had rolled away from the meat, when, with a spring, he had it and was away."[50]

On Sept. 16, 1901, while camped in Colorado, on the south fork of Williams's River, the boys of my outfit found a sick Fox (*V. f. macrourus*) in a willow thicket. It was very thin and weak, and its hind-legs were paralyzed; it could hardly walk. One of the men killed it with his riding whip and brought it to me for examination. Its mouth was full of Porcupine quills, doubtless its inside was also suffering from the same, but its condition was such that I did not risk an autopsy. Though an adult male, it weighed only 6 pounds 10 ounces.

I have several times seen a Fox mobbed by birds, usually crows, but once by a lot of kill-deers. These noisy plovers seemed to be actuated by fear for their young, recognizing very clearly that the Fox was an enemy, but the crows could not have been inspired by such a thought; in one case, indeed, it was mid-July, but the Fox had already secured a fowl, and the crows were mobbing him because, knowing his dislike of "a scene," they hoped he might abandon his plunder to get rid of them, and so they would profit by his success.

A deeply impressive record of circumstantial evidence is contributed by F. H. Pierce, of South Londonderry, Vt. He says: "I had a strange experience not long ago which may interest some of your readers. In digging out a Fox we had holed, we found, about 20 feet from the entrance to the

[50]Recreation, May, 1897, p. 339.

burrow, a dead Hedgehog, badly mangled. Beyond him lay another in even worse shape than the first. At the end of the hole we found the Fox. He, too, was dead, and his pelt from head to feet was full of quills. He had evidently killed the Hedgehogs, who, perhaps, had tried to take possession of the burrow, and had died from his wounds."[51]

Fighting the Fleas

Every animal with fur so deep as that of the Fox is more or less plagued with vermin. The Fox pays the price of his fine coat, and it is certain that unless he has some effective way of combating them, the fur-lice would reduce his strength so much as to make him an easy prey to other enemies; that is, there is danger of the species being destroyed by the vermin—a circumstance that I believe has often obtained for others in past ages.

But the Fox is credited with an exceptionally clever device for reducing his flea-pests. I have heard the story in different forms and many times. As samples, on which I do not pronounce judgment, I give the following:

Peter Kachline, of Stockertown, Pa., writes: "While in the woods recently, I came to an old sawmill dam. I heard a rustling in the leaves, and keeping quite still, I saw a Red-fox come up to the water with a piece of pine bark in his mouth. He waded into the water, so I could see only his nose, or the piece of bark, sticking out. He stayed that way for about 5 minutes, then dropped the bark in the water, scampered out and ran back into the woods. I examined the bark and found it covered with fleas."[52]

W. C. Vogt writes: "Some years ago, while fishing in the State of Pennsylvania, a Red-fox came out from the edge of the woods into a cornfield. He put his front feet up on the side of a shock of corn and looked as though he was eating corn, but a little closer watching showed he was pulling out cornsilk from the end of the ears. After he got a mouthful of this cornsilk about the size of a man's fist, he started for the stream and, stepping very carefully to the edge of a nice, placid pool, he started to back into the water with his tail first, going very slowly until only his nose and cornsilk appeared above the surface. He then ducked his head under the water and let the cornsilk float. He came up, swam to the other shore, climbed up on the bank, shook the water off and started off on a fox-trot for parts unknown. In getting the floating cornsilk with a long stick to examine it, I found it full of lice, and could see it was a plain case of the lice keeping just ahead of the water, running up his back, then from his nose into the cornsilk to escape getting wet. A friend and I experimented with some Dogs a few days after.

[51] Recreation, March, 1902, p. 227.

[52] As above, June, 1898, p. 476.

The Dogs had fleas, and we used cotton and tubs of water, and, by dipping the Dogs in very slowly, the fleas would run up their backs and jump into the cotton held at the tip of the Dog's noise. Surely the Fox has intelligence."[53]

Last of the cloud of witnesses, General A. R. Benson of Dover, Del., tells me that about 20 years ago, James Kersey, a hunter that he knows well and considers reliable, saw a Fox in the woods along Jones Creek, Del. It came along a wire fence where Sheep were pastured and gathered a bunch of wool, then backed slowly into the creek till nothing but its nose with the wool was above water. Then it let go the wool and went off. Kersey examined the wool and found it swarming with fleas.

Diseases

There are several records of rabies among Foxes, but none of other epidemics, so far as I know.

Many reports of mange among Foxes have appeared in various journals, but no definite information is at hand.

Age

The following affords important light on the age attained by this animal. Christian Sanderson, of Chadd's Ford, Pa., tells me (Oct. 30, 1905) that in March, 1897, an old dog-Fox, locally famous as a runner, was trapped near the Ford. A silver collar with inscription was put on his neck, and he was released on the one hundredth anniversary of Bayard Taylor's fox-hunt in "Kennett." He lived and doubtless was hunted many times until 1905, when, after a good run, he was killed at a point 60 miles due south of Kennett. He was evidently aged when killed. Thus he had run for 8 years after he was fully adult. This agrees with the belief that a Fox is old at 10 years and rarely reaches 15.

Strange Incidents

Geo. A. M. Williams sends me the following from Newburyport, Mass., Nov. 23, 1910. The gunners killed a Fox that week. "It was a full-grown Fox and around its neck was attached—or rather embedded—a small Dog's collar, the size used in puppyhood. It was necessary to cut it from poor Reynard's neck to get it off."

Several cases of Fox surgery are on record. The following is typical:

"One day in winter when the snow was deep, our farmer found a very young Red-fox in the woods, and brought it home. For many months Redtail lived at the farm, and was the constant playmate and companion of the

[53] Field & Stream, March, 1921, pp. 1004, 1030.

farmer's little daughter. When summer advanced, he was placed in an enclosure in the farmyard, where he had his kennel, although he seemed to much prefer a deep hole he had burrowed in the earth beneath it.

"One morning the farmer discovered that in some way he had broken his forepaw. How, no one could tell, unless he had gotten it tangled up in his chain. Although very tame, he now utterly refused to let any one come near him or attempt to touch the broken paw, and after repeated efforts to catch him and put a bandage or splint on the paw, he was so savage that the farmer was forced to conclude the little creature must be shot. He put off this duty, however, as his little daughter could not bear the thought of losing her playmate.

"The following morning, the farmer carried Redtail's dish of milk out and found him lying in his hole, and to the farmer's surprise, he refused to come out. When the dish of milk was placed where Redtail could reach it without moving, he ate his breakfast with great gusto. Looking closely, the farmer discovered how instinct had taught this little creature to make a 'plaster jacket' for his broken paw. There he lay with the paw carefully buried in the earth, which was firmly packed down, and as long as he did not move the paw, it was safe. For many days he lay there, gladly taking food and water when placed near enough to reach without moving the paw, but refusing to come out of his self-made hospital. Finally, one day, he limped forth and gradually the strength returned to the broken paw, and when I saw him last, he was as lively and playful as ever."[54]

Another interesting case of a Fox cub that knew how to take care of himself is vouched for by Dunham Wheeler, of New York. He had 5 young Foxes in a cage; one of these had the ill-luck to break his hind-leg. The others plagued him so that their captor gave him a little box in which was room only for one. Here he at once ensconced himself, snarling savagely and threatening, with back-turned ears, whenever any of the others approached; and he stayed there until the broken leg healed, when he leaped out as sound as ever.

In *Recreation Magazine* of Feb., 1898, pp. 123–24, is a Fox story that has the merits of strong local colour and intense surprise. It took place in the north country long ago, and is told by Eugene C. Derby. I give it in brief:

An old Fox-hunter was waiting on a stand for a Fox that his hound was driving. The Fox was passing out of range, but came at once to a "Mouse squeak." He approached, hidden by a boulder, but at 12 feet, one eye and one ear and the tip of his nose showed round the cover. The gunner fired. The Fox bounded off about 15 feet, then, on the top of a knoll, turned round

[54] Letter from Mrs. W. E. Bullard, Larchmont, N. Y.

and lay down, with tail lapped carefully around him. The gunner slowly reloaded his "muzzler," the Fox still curled up asleep.

Now the bawling of the approaching hound was heard, the gunner turned his head that way for an instant, and when again he looked for the Fox, he had vanished. The man stepped on the knoll, and had a clear view in all directions for a quarter of a mile. But no Fox appeared.

The hound arrived in full cry, but at the place where the Fox had lain down, ceased baying. There was no cover, no trail, no sign of Fox. A second hunter with a hound came. He also had to give it up. The Fox had vanished like a phantom, leaving neither track, blood, hair, nor scent, and all about was open level ground.

A year later, they wounded a Fox which made for this same place. Under one end of a log was an old Woodchuck hole with thick grass around. The wounded Fox crawled into this. When dug out, they found with him the skeleton of another Fox, undoubtedly the ghost Fox of the year before.

Apparently a shot had hit him in the eye, stunning and blinding him. He lay still on the ridge till roused by the baying of the hound. Then by a convulsive, dying effort, he had tumbled into the Woodchuck hole. The hounds evidently sensed that the Fox was dead, so considered the affair closed at the time.

A melancholy incident which I give for its value as a winner of kindlier consideration is the following from the pen of Andrew Price. of Marlinton, W. Va.

"My sympathies were aroused though at the miserable tale of the trapping of a Fox on the mountain overlooking this village. A Fox had been put in a hole in the rocks and a trap set for him. Fourteen days after, that Fox came out and submitted to his fate. When found, he was nothing but a skeleton and was so weak that he showed no fear of the trapper, who put him out of his misery. A story of such suffering is painful to consider."[55]

Hybridity

On Jan. 28, 1902, at the Cincinnati Zoo, I was shown a curious creature supposed to be a cross between a Fox and a Dog. The Director said it had been found in the woods near Cincinnati when it was perhaps two months old. It was lying in a hollow stump with two others of the same kind. The boy who found them, carried them home without waiting to see of what sort the parents were. Two died, but this one was successfully reared on a

[55] Forest & Stream, April 1, 1899, p. 244.

bottle. Its appearance suggested Coyote rather than Fox, I thought, but there were no Coyotes within some hundreds of miles. The creature was good-natured and friendly, and had much the appearance of a slim, yellowish Sheep-dog.

A cross between a black-and-tan terrier bitch and a tame dog-Fox was kept for some time by Lord Cranley, in England. It was about halfway between the two species in colour and other external characters, but strange to say, the tail tip was black.

The drawing of it was made by Sir Edwin Landseer and appears as Plate 23 in a collection of animal portraits, published, 1853, London.

The Carrion-Craze

The habit of rolling in compounds of strong or even disgusting smells is well marked in the Fox, and often used by the trapper. The following was related by L. R. Gridley, of Appleton, Wis. His wife's father, a trapper in Wisconsin, found a certain trap sprung again and again, but nothing in it except long Fox hairs. At length he sat up to watch. At 4 in the morning, the Fox came and rolled over the trap. It sprung at once, but could not grip on his broad body; he ate the bait in comfort and went his way. But the trapper now set one of those abominations called a clawed otter-trap, and next night Reynard was caught by the back.

Marriage Customs

The Fox is more or less a solitary animal in winter. He may travel about with his mate at times when the snow is on the ground, but he never assembles with others of his kind to form a pack.

The mating instinct is awakened in late February or early March, and then the track in the snow is often doubled. Those who in New England have followed it for miles at this interesting period, tell me that all the chapters of romance are duly recorded in the snow—the pursuit, the coquetting, the conquest, even the fight between rivals, are fully set forth in the tell-tale white.

These fights I have never witnessed among wild free Foxes, but L. W. Walker, living in the Yellowstone Park, writes that there they are of daily occurrence in late winter, and the part played by the tail is quite important. When the rivals approach each other with hostile intent, they stand sideways with the tail raised and pointing forward over the back, ready for use as a parry or as a feint; dashing it in the eyes of his foe, the Fox distracts attention or prevents him seeing for a moment, during which time he tries to gain some advantage.

A vivid picture of Fox courtship is given by the well-known woodsman, Will W. Christman. He was fortunate in seeing the affair, and again fortunate, most of us think, in having failed to add the finish he intended.

"While busy about the farm work," he writes, "I have had memorable glimpses of the Fox. On one occasion two years ago, I was ploughing in a remote field. It was an Indian summer day, late in November. All that morning I had taken a lively interest in the insistent cawing of a flock of crows just over the ridge. I was on the point of making an investigation when the flock moved eastward, following a fence row, and then turned down the hill along the woods to the wild pasture. The cawing continued, and mingled with the raucous cries, I heard the barking of a Fox. This sound, so associated with the darkness and cold of autumn and winter nights, seemed strangely out of place. I left the plough and hurried down the hill to witness the performance.

"The Foxes, for there was a pair of them, were evidently not of one mind, which accounted for the commotion. They were standing two or three rods apart, facing each other. Suddenly one rushed forward, the other meanwhile standing motionless. Then I heard a succession of hoarse

yelps and the advancing one wheeled and retreated to his former position. This performance was repeated several times. I could not be sure which Fox was doing the barking, but thought it was the motionless one. At a distance of 175 yards, they paid no attention to me.

"The opportunity was not to be lost. I ran down to the house and 10 minutes later when I returned with the gun, they were still at their play. Screened by the clumps of witch-hazel and hardhack that dotted the pasture, I approached almost within gunshot unobserved, but the ground, honeycombed by the frost of the previous night, crunched under my feet, and at last betrayed me. I caught a glimpse of the pair as they cleared the wall and a good view as they loped gracefully up the hill. One was large and dark, the other smaller and lighter in colour, male and female undoubtedly.

"Twice before I had heard the Fox bark by day. Both times I was quite sure it was a lonely male advertising his bachelor condition; on this occasion, I imagine it was the female reproving a too ardent admirer."[56]

If this truly was a courtship affair, it was unusually early in date, at least two months ahead of the customary season.

Thomas Anderson, of Fort Smith, Hudson Bay Post, tells me of a curious occurrence that he witnessed at Poplar Lodge River, on the east side of Nipigon Lake, early in March, 1896. As he drove his dog-train around a point, he came on a pair of Foxes *accouplée*. Supposing that he could easily secure both, he set his Dogs after them, but they turned their heads one way and raced off side by side, allowing no stick or sapling to come between them; and thanks partly to a slight crust, they left the Dogs far behind and escaped, without parting company.

Monogamous. A vast array of facts gathered among wild Foxes and a similar army of indefeatables from our Fox ranches, have definitely settled this: that the Fox is a strictly monogamous animal.

One of the important things established is that the male Fox takes an active interest in the young, and by retroactive reasoning, he must have but one wife. It is law among mammals that no polygamous or promiscuous male ever concerns himself with the welfare of his offspring. Either he does not known which they are, or they are too numerous for possible attention.

Granting the pairing—and the Fox ranchers have settled that beyond doubt—the next question is whether it is for the season or for life.

There is much evidence of Foxes consorting in pairs *after* the breeding season.

Joseph M. Dohan, the enthusiastic Fox-hunter of Philadelphia, writes me that the Foxes are mostly seen in company during the mating season. He

[56]Forest & Stream, Feb. 4, 1911, p. 177.

has also seen it during the hunting time, and has often known them to change off; that is, one take the other's place in a run before the hounds, whether deliberately planned or not, was uncertain. He adds: "I have frequently, in hunting, seen Foxes working together, and there are many accounts of their doing so for the purpose of relieving each other. The fact may be taken for granted, but whether this is the reason may be doubted, since it imputes a high degree of sagacity which I am not sure the animal possesses."[57]

Another strong bit of evidence, showing that the male takes a friendly interest in the female at the non-pairing season, is given by Millais—an interesting item which, though on the British Fox, helps as collateral evidence.

"When food is abundant," says he, "the Fox will often bury what he kills and return later, sometimes bringing a friend with him to sup."[58] And who is this friend? Almost certainly, his wife.

It is well known that the English Fox will unite with another, probably its mate, to catch a Hare, by the old stratagem of drive and ambush. W. R. Hine reports a similar subtlety on the part of the Fox in Manitoba.

Near Morris, in the autumn of 1885, he saw 2 Foxes working together to stalk some Canada geese that were feeding on the open prairie. One Fox was lying in wait in some slight cover; the other was approaching from the opposite direction, 100 yards away. It crawled as close as possible, then, seeing that the ever-watchful geese were alarmed, it began to roll about on its back in plain view, and tumble over, looking much like a bundle of dry grass that is being blown about by the wind. Each move brought it nearer to the geese, who, knowing it well for an enemy, kept moving away as they grazed, and thus drifted toward the Fox in ambush. Hine was satisfied that the two were working together, but did not see it out. When he had got to within about 50 yards he "collected" the Fox and a goose with "right and left."

L. W. Walker says that in the Yellowstone Park, the Foxes feed during winter time on White-tailed Jackrabbits. He says: "When the snow is deepest, they rely largely on Rabbits and on the carcasses of Elk, Deer, and other winter-killed animals. A Jackrabbit gives a Fox a hard run, and Reynard has learned to hunt in pairs, getting on to the runways, and one taking up the chase when the other becomes weary."[59]

These are samples of the abundant evidence that the Foxes consort in pairs, male and female, *after* the breeding season, during the time when their

[57] Letter, Sept. 22, 1905.

[58] Mamm. Gt. Br. & Ire., I, p. 209. Also See *Zoologist*, 1885, p. 164.

[59] Recreation, May, 1897, p. 339.

union is one of friendship and sympathy only. This points to union for life.

The consensus of opinion among hunters and naturalists, according to Dr. Woods Hutchinson, agrees with this conclusion. [60]

Thus, so far as the evidence goes, the Fox is proven to have attained the highest level of animal marriage. They are strictly monogamous, their union is for life, they are faithful to each other at all times, and as different as possible from Dogs, which, indeed, seem to have been corrupted by their long association with man. These facts I have endeavoured to set forth in my story "The Silver Fox," and in my essay on the "Natural History of the Ten Commandments."

The Den as a Home

There is no direct, but much inferential evidence that when the young Fox couples go a-honeymooning, it is the female that selects the den site. and probably she that does most of the digging.

She is the one most actively interested; on her is the chief urge of the All-mother, and the den is always more her property than his.

The fact that in a large part of the Fox range the ground is hard frozen when the need for a den presents itself, must raise a difficulty. But it seems likely that the difficulty is met in most cases by enlarging the abandoned hole of some smaller animal, such as a Woodchuck or a Skunk.

Geo. L. Fordyce, of Youngstown, O., sends me an interesting account of a den beginning in a 2,000-acre tract of wild land near his town.

In early March, 1917, there was a heavy snowfall.

"On Wednesday, March 7th, it began to thaw and continued to thaw that night. I decided to go out to the Boardman woods Thursday morning, March 8th, to look for the Foxes, taking my lunch so that I could make a day of it. Leaving my automobile on the main road, I went back about a mile to the woods and soon after going into the woods, crossed a Fox track which I followed up to a place where several trees had been blown down. Here the Fox ran for some distance down one of the trees and jumped far off to one side before going on. This was repeated at the next fallen tree, and finally I got to a place where the trees were massed so that I could not follow the track through. I then circled and found several places where the Fox track came out from the treetops for a short distance, and then went back. I followed each of these tracks in as far as I could, and finally followed one that ended where the Fox was excavating an old Groundhog hole. While there was but little dirt thrown out, I looked on the other side

[60] Animal Marriage, Contemporary Review, Oct., 1904, pp. 485–96.

of a little knoll to see if the hole came out, but it did not. When I was perhaps 10 feet from the hole, a beautiful Red-fox came out and gracefully ran away. Its tail was extremely bushy, looking almost as large as the body of the Fox. It came out so quietly and ran so carefully through the snow that I did not hear a sound, but stood still and watched it for perhaps 400 or 500 yards, until it disappeared. I then went farther on into the woods, and finally found another track, which I followed for perhaps 40 or 50 feet, and found a den with a great amount of fresh dirt excavated, and 3 or 4 entrances or exits open. There is no question in my mind but this will be a permanent den for the Foxes. I then followed a track which left this den, through the woods, and found several places where the Fox had stopped and rolled in the snow. Finally, after following it for considerable distance, I could tell by the tracks and the way the Fox ran that I had 'raised' it. While following it, I discovered one place where it had gone into a hollow log, which would be a possible place for young, according to my boyhood experience." [61]

The den, or "earth," is the nursery of the Fox. Although used chiefly while the cubs are nursing, there are cases to show that some Foxes live at home the whole year round.

It is approached by a burrow of 9 to 12 inches calibre, usually on the sunny side of a hill or bank. Sometimes the Foxes make it themselves; sometimes they adapt one that they find.

A Fox den which I examined on a wooded hill, near Toronto, had 2 or 3 entrances. This was made like the home of a Chipmunk, that is, all the earth was scratched out of one hole, though there were several doorways. Those chiefly in use had no earth-pile about them to make them conspicuous. Indeed, one might have been within 10 feet without suspecting their presence.

I have, however, seen many newly made Fox dens which had no earth-pile whatever, though the tunnel was fully 10 feet deep. Evidently the Fox had disposed of the earth by scattering it.

The nest is made in a dry chamber a dozen or more feet from the door, and is sometimes lined with a little dry grass.

Geo. L. Fordyce writes me that in northern New York State he once found a Fox den in a hollow log, another in the base of a hollow standing tree, and yet another in the ground, apparently dug by the old Fox. This was as here shown (Plate CIII). It consisted of two separate parts, the den and a store-room, with a quantity of food.

"I think," he says, "this was originally a Woodchuck den, which the

[61] Letter, March 9, 1917.

old Fox enlarged. I have double-lined the Woodchuck part. Both the store-room and the sleeping room seem to have been made by the Fox."

Ventilation. "The air-shaft was one of the Woodchuck entrances. The Foxes had only one, but this was the only Fox house I ever knew that did not have 2 or 3 different doors."

The place around a Fox den is usually littered with bones and feathers of their prey, but they also have an indoor banqueting hall. "During the winter of 1878," says Fordyce, "I had tracked a Fox into this den. In early May it was reported that Foxes were killing lambs in the neighbourhood. I went at once to the place and found about the hole some bones, wool, and feathers, indicating that it was the home of a Fox family. The next morning, 2 other boys went with me to dig them out. We followed the main hole, which went down with a gradual slope for about 3 feet from the surface of the ground. It continued nearly level for about 20 feet, where we found 3 young Foxes grown to about the size of an ordinary House-cat. After getting them into a bag, we went back to a branch from the main hole that we had passed in digging. Following it for about 4 feet, we found an enlarged dugout space which was used as a store-room." (See plan, Plate CIII.)

Cleanliness. "There was no bed or lining anywhere, just the clean, sandy clay in which the tunnel was made. I noticed in particular also that there was no excrement or offal of any kind anywhere in the den. In fact, everything was decidedly clean and tidy, though, of course, there was the Fox odour. Some bones, feathers, and one or two lamb's legs were found on the pile of dirt that had been thrown out in making the tunnel. There were, however, but few there, and I am inclined to believe that they were perhaps brought out and left there by the young, and would have soon been carried away by the old Foxes. This is a mere guess on my part, but it is very certain that the leavings at the den did not represent more than 2 or 3 days' meals. The scarcity of garbage about the den and the remarkable neatness of all indoors, make me believe that the old ones habitually carry away the dung and rubbish."

The Den as a Refuge

The use of the den ends practically when the young are raised and scattered. The occasions when a Fox dens in autumn or winter may be considered exceptional.

Foxes have little use for a den in winter. At one time I thought they kept entirely clear of them while the snow was on the ground, but in following one that had gone off with a trap on his foot, I found that he went into

every den and Badger hole that he came to, apparently in hopes of leaving the hateful trap behind.

W. R. Hine tells me that he also has tracked Foxes into dens when there was snow.

But my observations show that the Fox is amply clad to resist the weather, and finds it much safer in winter time to take his necessary sleep in some open place where he can see or hear the approach of any danger.

An exceptional case was reported to me by Mittigwab, an Indian, on Ottawa River. In late October on Des Moines River, Que., a Fox barked at him and ran into a hole. Four days later he saw the Fox again doing the same thing. He plugged the hole, dug it out, and killed the Fox. It was a prime female, but why in a den at this season?

When hard pressed by the hounds, the Fox considers the den a possible, but dangerous, last resort. Old Foxes can scarcely be made to hole up. Cram says: "Although he knows of 3 or 4 dens within easy reach, it is only when wounded or tired out by a long run in light snow, that an old Fox ever takes to earth, though last season's cubs sometimes become frightened when the hounds get too close, and allow themselves to be driven in."[62]

So also, Joseph M. Dohan, an experienced fox-hunter, writes me: "I could never quite understand why a Fox, even when severely pressed, should continue on his line, when he may take refuge in any of the earths which he may find a mile apart throughout the whole of the hunt district. The only reason I can conceive for his not doing so, is that he is naturally suspicious and will not take refuge in any earth except his own, fearing that snares may have been laid for him. I do not mean to state that the Fox never goes to earth except in his own kennel, but that they seem to have a strong disinclination to do so."[63]

These animals reflect the normal and ancient habit of the Red-fox, but it seems that the steady pressure of that man-made peril—the unrestrained, night-roving hound—is developing a new habit. Like the inexterminable Woodchuck, the Fox of New England is proving the wisdom of flying, when in danger, to the bosom of his Mother Earth. B. A. Eastman, the Vermont foxhunter, writes me, April 3, 1924:

"While hunting in a certain section where a litter of young Foxes were raised, I found it almost impossible to run a Fox over 10 or 15 minutes before it would take to the ground. In fact, I saw them run in Woodchuck holes immediately after being jumped. The hound was not a fast-running Dog, and in other localities the Foxes ran nicely ahead of him. I could not, for

[62] Am. Anim., p. 269.

[63] Letter, Philadelphia, Sept. 22, 1905.

some time, account for this unusual occurrence. I believe I discovered the cause. A farmer who lived near the locality, told me stray hounds ran there all summer, particularly during the night. I argue that they were constantly run during their puppyhood, and, of course, ran in their burrows for safety, it having become a confirmed habit of holing as soon as the hound barked. I often hear houndmen boasting of their fast-running Dogs and how a Fox could stay above the ground ahead of their Dogs for only a short run. This may explain it."

Though ready to abandon a den that is much interfered with, there is much evidence to show that a Fox pair will come back year after year to the same den, if it prove to be a place of pleasant experiences.

Young

The period of gestation is now known to be 51 days, without more than 12 hours' variation.

When the mother feels her time approaching, she manifests something like hostility toward the he-Fox. She becomes possessed of a repugnance toward him that is seen in many animals at this time. Although they have been living and hunting happily together hitherto, she now warns him to keep away. He, no doubt, helped to dig the den, but now he is plainly told to keep out of it.

However puzzling this capricious attitude in his partner may seem, he generally takes the hint and refrains from entering the den until the embargo is removed. This formality is supposed to be about the time the young ones' eyes are opened, that is, on their ninth day.

The young are born in March or early April, and number from 4 to 9. N. E. Skinner, of Winnipeg, tells me that at Winnipegosis he found a Black Fox that had young so early in the season that the mother's pelt was prime, bringing $75, though the young were big enough to rear by hand.

The cubs are clad in lead-coloured fur and look as much like kittens as Foxes when they come. They are blind till 8 or 9 days old. They do not venture out of doors till they are 3 or 4 weeks old, and the den continues to be their only home for 3 months.

Home Life

The home life of the Fox is ideal. Few animals come up to the Fox standards of love and devotion where their offspring is concerned.

Although the male is not allowed in the den during the first few days after the birth of the young, he continues on guard in the neighbourhood and brings food to his partner.

PLATE XCVII. FORE AND BACK TRACKS OF FOX, DOG AND HOUSE-CAT, IN FINE DUST
ALL LIFE SIZE
From nature by E. T. S., 1901

The unselfish devotion of the mother Fox is proclaimed by all who have had a chance to observe her at the time. Many touching stories are told in illustration.

Fordyce sends me the following interesting notes on the Fox family that he observed near Auburn, N. Y.: "One morning in the end of March, 1877, a man came to the store in the country village where I lived and said that while coming across the fields of a neighbour, an old Fox had jumped out of a hole in a tree near which he was passing, and run away barking. I overheard what he was saying, and as it was the same wood-lot in which I had found the 2 young Foxes the previous June, I at once thought there might be some cubs in the tree. I started out across the fields and 'back-tracked' the man, there being snow on the ground, until I came to the place where he had stopped.

"The tree was a standing basswood about 4 feet in diameter. The Fox track led from the hole at the base of the tree, but no track came to it. As it had snowed the night before, this indicated that the old one had gone in before the snowstorm and remained there until the man had frightened her away. I reached into the hole and found that the hollow diameter of the tree was about 2 feet. I felt a warm bunch of little creatures, one of which I pulled out, looked at, and, as I had expected, it was a young Fox. I then removed my coat, laid it on the snow beside the tree, to put them on a warm spot, and took out the others, 9 in all. The little creatures did not look unlike new-born kittens, but were about twice as large. Their eyes were not open, and I do not think, from their condition, they were more than one or two days old. I selected one of the lot and took it home to raise, but, having no way to feed it properly, it died within a few days. I then followed the track which the old Fox had made when the man had frightened her away from the tree. She had run directly to a hilltop, nearly a quarter of a mile away, and there stopped to watch him. I followed her track farther and found where she had stopped many other places, and, finally, where she had stood on a high stump and probably watched me while I was at the tree looking at her young. In fact, I believe she had watched me from this stump while I had been following her trail, because her tracks showed that she had run with greater leaps from the stump straight away into the open country.

"The next morning I went to the tree soon after daylight, and the young were gone. There was a maze of tracks coming and going to the tree. I started out to follow them, settling down to one which I followed with considerable difficulty on account of other tracks crossing it, but I finally succeeded in locating the den into which she had carried them. It was an old

burrow in a hillside about a quarter of a mile from the tree. In going back and forth, she had gone over a different route each time, sometimes far out from a direct line on either side, and sometimes far beyond (see Plate CIV). The number of tracks showed that she had carried the young one at a time. For the next 2 or 3 months, I went to the locality of the den frequently, and occasionally, from a distance, would see the young Foxes out playing in the sunlight. When I attempted to steal nearer to them, I would invariably hear the old one give a bark or two from some place on the hill, which was a signal for the cubs to disappear into one of the holes. About July 1, when the young became larger, my desire to take one became irresistible. As the den was in ground that was filled with rocks and roots of trees, digging for them was out of the question, so I decided to set traps in each of the holes

"The next morning I found one of the traps pulled out of the hole and sprung, likely by the old Fox. I set this trap again, but none of the traps were disturbed thereafter, the Fox family having moved away."

On these occasions Fordyce saw only one Fox about, and assumed it to be the female. His observations, however, were made chiefly while the cubs were small.

A more detailed case is furnished me by the Rev. J. Fraser Cocks, of Manitoba. The following incident took place during his life at Silver Creek, Man. In mid-May, 1894, "about sundown," he says, "I saw on a prairie knoll a mother Fox and 5 young. I came on them suddenly; the old one barked loudly with short sharp yaps. All bolted underground by various holes. One little fellow got into a wrong hole that was either too short or too strange, and at once he peeped out again. I threw a pebble at him. It chanced to hit him between the eyes and stun him. I carried him homeward by the hind legs, but he soon recovered, and though no larger than a half-grown kitten, he bit savagely at my legs.

"I chained him up. He barked and whined every night and all night long. His mother came about, and my partner tried to shoot her by watching, but she was too alert. The little one could eat Gophers but preferred Mice. One day, while my partner was teasing him with a dead Mouse, the little chap sunk his teeth in his tormentor's fingers.

"He was a perfect nuisance barking every night, so after a week we turned him loose. He ran for the woods a quarter of a mile off, and was at once met by the mother and led safely away. She had never ceased watching about, all the week, in hopes he might escape, and now I found she had moved the rest of the family away to a distant and safe burrow. We saw nothing of the father."

Mother Love

Will W. Christman, of Delanson, N. Y., writes on Fox ways: "Hardly a season passes here without someone locating a den and making captive the whole litter. Two years ago, I accidentally discovered one, and with a neighbour's help, dug them out and made them secure in the corn crib. At times they were as playful as kittens, but they often fought like Dogs over their food. The first morning after their capture, I saw the old Fox nosing around their prison. One of the young died in a day or two, and my boy carried it to the woods. The next afternoon, when he returned from the pasture with the Cows, he informed me that he had found a young Fox dead near the scene of the capture. I thought at first that it might have been one that had died in the nest, and we had overlooked it when we destroyed their roof tree; but after investigating we found it to be the one that had died in captivity, as the one could not be found that my youngster had disposed of. We concluded that the mother had carried it back to the old home, a quarter of a mile or more. How unconquerable this mother love! I must confess that I felt something like remorse at finding such a human trait in my enemy."

One April, he and a trapper friend went to an abandoned farmhouse in their neighbourhood.

"As we entered the door yard," he says, "I found a Muskrat hide, freshly skinned, on the grass, a little farther on, some bunches of Rabbit's fur. 'Have we a Fox den here?' I thought. 'Here are the usual earmarks', but it seemed a most unlikely spot. At the corner of the house we found a hole, probably opened by a Woodchuck, leading directly into the foundation. Scattered about were hen's feathers, and a small Pig had been poked into a crevice in the crumbling foundation. The Pig was one that a neighbour had lost a few days before, and had been consigned to the manure heap. Now it was evidently held in reserve as a choice morsel for some wild gourmand. After a careful examination of the hole and of the cellar—for the doors were unlocked—we plugged the opening with stones, promising the tenants a call later in the day.

"That afternoon I was called away, and my neighbour, after waiting some time for me, started alone for the prize. A large straw-stack stood near the house, sloping gradually down to where the machine had stood in threshing time. As he neared the place, he saw the old Fox on the top of the stack. From this 'coign of vantage' she could overlook the surrounding fields for half a mile. This was undoubtedly her 'crow's nest.' No friend or enemy could approach unseen. She took to her heels as my friend

approached. The cellar had been lathed and plastered, and far down in a remote corner behind the plastering, he found them, 3 lively little fellows, about half as large as a fair-sized Cat, and 2 very small ones dead. Probably some hound had given her chase shortly before their birth. This would account for the mortality among them. (Since then another neighbour informs me that he found 2 of the young dead in a hole.) We kept them in the corn crib as we had kept those of the year before. I think the old Fox came nightly and prowled around the buildings. One of my hens had hidden her nest in some berry bushes between the corn crib and wagon house. One morning I found her limping around the barnyard minus her tail. Every tail feather was pulled out and scattered in a bee line from her nest to the yard. Her eggs were cold, and she seemed to have lost all interest in them. I looked again next day and several of the eggs had disappeared. I took them all away, and at night took a fresh egg, and after putting a little strychnine inside, I placed it in the nest. That too disappeared, but it was several days before I knew that my experiment had been successful. Then my boy found the female Fox dead in the edge of woods, less than 100 yards away."[64]

The Spartan Mother

I had several times been told by hunters of Fox mothers poisoning their captive cubs because they could not free them. I am more sceptical of these accounts now than I was formerly, because the evidence was faulty, not because, as some have illogically asserted, this would postulate a knowledge of the nature of poison and of death on the part of the Fox. It would be just as true to say that a Cougar has a comprehension of locomotor paralysis because it aims to disrupt the spinal cord of its victim.

Without pretending to decide finally whether these were cases of Spartan fortitude, perverted instincts, or merely brutal murder, let me refer to certain other tragic happenings that have taken place under the urge of unusual stimulation, and to certain well-known facts that bear on them. Cattle will often kill one of their own kind that is in dire extremity; a crow in trouble is sometimes destroyed by its friends; a Mouse in a trap is often devoured by its own companions. E. Hofer reports a case in the Yellowstone of a little Bear cub that on the first night of its captivity was killed and eaten by one of its adult wild kinsmen. In menageries, many carnivorous mothers, including Foxes, kill a large proportion of their own young, especially when they learn that man has tampered with them.

[64] Forest & Stream, May 25, 1907, p. 811.

And, finally, Wolves and Foxes have certainly grasped the idea that poison is a thing of danger. These various facts bring us much nearer to acceptance of the hunter's tradition, without, however, being conclusive. They at least remove it from the category of the wildly impossible.

The Father Fox

But the father is ever ready to play his true part. Many observers, among them W. R. Hine, have found the home in cubbing time, and in each case both parents were about; it seems quite certain that the father takes an active interest in the young and helps to care for them. All of which emphasizes the conclusion already offered—that our Foxes pair.

In Ontario, where I well know the Springfield Fox, I made many observations showing that both parents take active care of the young. In Maine, E. Norton says, the male Fox has as much to do with raising the family as the mother has.

A veteran fox-hunter, J. H. Whitcomb, writes me from Ayer, Mass., on April 3, 1909: "A day or two ago, I saw a Fox den where I think there were young ones, and close by in the sand a Skunk half buried. I suppose it was for madam, to save her from hunting."

In Wales, as T. W. Proger of Cardiff writes me, the male Fox is a faithful partner, bringing food to the female while she is suckling the young, and has a great affection for his offspring, sharing with their mother the labour of feeding and caring for them.

"When the cubs are very young, he will frequently bring food right up to the earth, but as they get older he does not do this, but drops it at a distance from the earth, 100 yards or more. This may be done to teach the cubs to hunt for themselves, for the Rabbit or bird, as the case may be, is often covered lightly with leaves and mould, and it would certainly be very good practice for the youngsters."

A touching case of this paternal devotion was sent me later by this same naturalist:

"Last spring our old keeper destroyed a litter of young cubs, and stopped them into the earth. Four days afterward the old dog-Fox came right up to the earth and began to open it out again, I concluded, to seek his cubs, but he was caught in a trap which the man had set near the blocked-up entrance.

"I think this is very strong proof that the dog-Fox has affection for his young, because he knew very well that the trap was set there on the first night after the deed was done, but his strong desire to find the cubs overcame his habitual caution."

In the New York *Sun* for June 2, 1900, is given an instance in which the father joined with the mother in a hazardous rescue of their young.

"'Some weeks ago a den of Foxes was discovered on the bank of the Miami River near Redbank by 3 boys, John Bain, Lewis Shumate, and a boy named Lloyd. Young Lloyd took 2 of them to his father's place, near Redbank. They were fastened to a kennel with stout cords attached to collars. It is stated that persons in the vicinity frequently heard the old Foxes bark at night, and on Saturday night last Farmer Lloyd, hearing a commotion in the barnyard, went out and saw the parent Foxes scurry away. He then went to the kennel and found that the cords which had confined the young animals had been chewed in twain and the little ones were missing. It is the supposition that the parent animals released their young and carried them away in their mouths, as a Cat does her kittens.' Cincinnati *Enquirer*."

Referring to the second den which he found March 8, 1917, George L. Fordyce writes me that it "was used, and a family of young were reared there. I visited this den several times during that spring and saw evidence of their being there. I did not let any one know of it, as I did not wish to disturb this Fox family or have any one else disturb them. The male Fox remained with this family during the time I was making these visits, as on more than one occasion he would bark near me while I was some distance from their home, and the female would bark, apparently to let him know she was warned."

From many similar accounts which prove that in the Fur Ranches the father should be allowed to continue with the family, I select the following, from the *Black Fox Magazine*, May, 1921, p. 32. In this, the editor sums up the experiences of many fox-farmers.

"We are strongly of the opinion that harmonious pairs should be left with their families, and we would never separate them unless compelled to do so. Here is an experience we lately had. A litter was born about a week ago, but the pups had not been seen. Five days later the caretaker went into the pen at the usual time in the morning to feed, and noticed nothing out of the ordinary, as the male Fox was out and all was quiet. He did, however, notice that a Fox had been burrowing, and he plugged up the hole, stamping the ground down solid. About noon of the same day, in looking toward the pen, the male Fox was seen digging as hard as he could, and the dirt was flying in all directions, and the Fox was panting like a race Horse. The keeper felt that something was wrong, and, calling his assistant, they took shovels, and after digging down where the father Fox was labouring, they found the mother and four pups. After putting them back

PLATE XCVIII—LIFE-STUDY OF THE FOX THAT ATTACKED THE PORCUPINE, COLORADO

PLATE XCIX—IMPRESSIONS OF A FOX'S FEET FROM LIFE

Secured by Mrs. Grace G. Seton. *rf* = right front; *rh* = right hind; both are life size

in their underground den they seemed none the worse for their outing. Had it not been for the male, the chances are that nothing would have been discovered out of the way until it was too late to save this female and litter."

During June and July, I often visited the Ontario Fox den already referred to, sometimes going at night, and usually taking my hound with me. On each occasion, long before nearing the place, we were met by one of the old Foxes, who would deliberately cross our path or bark at us from a hillside, tempting the Dog away in pursuit. The latter would dash off at full cry, and I could tell by his tonguing that the trail led to a distant part of the country, either along the railway track or down the river, where the Fox easily got rid of him by some trick. One of these tricks I witnessed in daylight. The Fox led the Dog down the river, then, retracing his steps for 40 or 50 yards, he scrambled along a steep bank of sand that edged the stream. The sand apparently carried no scent; the hound could not follow it at all.

I saw the Fox do this several times at the same place. Indeed, he was shot here by one of my friends, in the act of repeating the performance. This turned out to be the male Fox. Evidently he was actively interested in the care of the young.

In view of all this evidence, direct and collateral, we are very safe in believing that the American Fox, like its European cousin, is very nearly ideal in its family relations.

The following from the pen of an old lumberman, whose name is withheld by request, affords not only clinching evidence of the he-Fox's good fatherhood, but also a charming picture of Fox family life at its best.

"I had been out looking over some timber prospects and had sat down near the bank of a creek, alongside of a big rock, to rest awhile. On the opposite side of a stream, not more than 5 rods away, was a high knoll. At the foot of that knoll a tree had been blown down by some old-time high wind, and by the fall the ground for quite a distance about had been loosened, showing a tumbled mass of earth and rocks and tangled roots.

"Between the creek and the fallen tree, the space was carpeted with a velvety stretch of grass. As I sat there gazing listlessly about on the surroundings, I noticed by and by that the soil and the stones at one side of the fallen tree were packed hard and worn smooth, indicating that something was in the habit of going to and fro there, and doubtless had a home beneath the tangle of the roots. I was on the point of getting up, crossing the creek and investigating, when I saw the nose and part of the head of an animal come cautiously out from an opening among the roots, and I sat still.

"It was plain that some animal was making a precautionary inspection of the surroundings. That inspection proving satisfactory, out from the tumbled mass stepped a Fox, boldly and proudly, and at her heels came 3 little Foxes.

"The old Fox, winking in self-contentment, sat down in the sunlight that was streaming in on that spot through the treetops, while 2 of the cubs played pitch and toss with her long bushy tail. A frog which had unwisely ventured from the creek border too near the Fox den, had betrayed its presence to the other cub, and that pudgy little beast at once seized it and began putting it to all sorts of torment.

"I had not long to wait for a new thing on the programme, for out of the bushes at one side of the knoll, another Fox, the other head of the family, came trotting on the scene, carrying a Rabbit in his mouth. Stopping in the midst of the family group, this Fox tossed the Rabbit in the air, caught it again as it came down, and then placed it on the ground before the eager cubs.

"The two old Foxes sat on their haunches and watched with evident satisfaction and approval the cubs, as they rent the Rabbit and devoured it. The meal was soon over, and then the whole family, old and young, capered and frolicked about on the grass carpet in front of their home.

"Suddenly the father of the family stopped his play, and instantly the others became quiet. With ears erect, nose high in the air, brush stretched straight out in line with his back, fore-feet braced well to the front and hind legs ready for a start, the Fox for a few seconds stood motionless. Then he gave a low cry and the 3 cubs tumbled helter skelter into the opening among the roots and disappeared. The cubs safely below, the old Foxes followed them down into the retreat.

"In a little while, the cause of the Fox family's alarm appeared. A chopper, on his way home, came along the creek on that side, passed by the knoll at the very threshold of the Fox den and went his way.

"I waited a long time, then, with no sign of a reappearance of any member of the family, and I was thinking of moving on, when I happened to turn my head and glance up the tree. There another unusual sight was presented. In an open space near the edge of the water on the side of the creek where I was, a ruffed grouse was scratching and pecking in the dirt. So I remained quiet and watched the bird.

"By and by I mechanically turned my head again, and glancing toward the knoll, I saw that my eyes were not the only ones that had discovered the grouse at the edge of the creek. The old dog-Fox across the way, peering out from his retreat among the roots, had seen the bird too. He

had come partially out from the den and was watching the grouse with eager eyes.

"Presently he stole away like a shadow into the bushes at the lower side of the knoll, and disappeared. A little later I saw him come creeping stealthily out, 100 feet down the creek. He stood there motionless a moment and then slipped noiselessly into the water. He swam the creek, gained the shore, scattered the water from his fur by a few vigorous shakes, and went silently out of sight in the bushes.

"I looked up the creek again. The grouse was still scratching and pecking in the open space near the water. That the bird was the object of the Fox's manœuvres, I of course had no doubt, and I kept my eye out for the next development. It was not long in coming. I saw sly Reynard come creeping, shadowlike, out of the bushes into the open in the rear of the unsuspecting bird, and steal step by step upon it.

"That he would have had his teeth in the grouse's neck a moment later is as sure as bird and Fox were there, but I wasn't going to stand for that, and before he could make his fatal spring, I rose quickly to my feet.

"Away whizzed the grouse into the woods. A flash of red fur and the Fox was gone. And although I sat down again and remained there a good half hour, he did not return to his den nor did any of his family show themselves. It was plain that the show was over, and I rose and went home."[65]

Education of the Cubs

One day (July 15) I saw the mother Fox carrying a live hen from our barnyard (at Springfield-on-the-Credit, Ont.) across the river and up toward the den. I believe she was keeping it alive with intent to let the young ones have the practice of killing it, just as a Cat will bring live game to her kittens.

As soon as the young are large enough to come out of doors, they romp and play about in a delightful fashion, combining the elegant suppleness of the Otter with the frolicsome ways of kittens, but are ever ready to fly home at the slightest alarm. Usually the alarm is given by the ever-watchful parents.

Concerning a cub which he kept captive, Geo. L. Fordyce writes: "One day in June, 1876, my cousin and I chopped 3 young Foxes out of a long hollow log. They were about one third grown and quite savage.

"We each took one to our homes. After keeping mine for several months, until well grown, it was killed by a neighbour, on account of catching chickens. It seems to me this Fox did some 'thinking' in its

[65] The Idaho Leader, Gooding, Ida., Jan. 12, 1911.

method of taking the chickens. I had dug a trench in the ground, gradually sloping it down until about 2 feet deep and 6 feet long. At the bottom of the trench I placed a wooden box with a wooden arch leading down to it. When the dirt was filled in, this made rather a good den underground. The Fox was fastened with a chain attached to an overhanging pole, which gave it free access in and out of this den with a radius of perhaps 20 feet on the outside. Our neighbour's chickens were running about the yard more or less, and the Fox began catching them. I watched to see how it was done, and found that when food was given the Fox, it would, instead of eating it, place it almost as far away from the opening of the den as its chain could reach. The Fox would then back down into the hole and wait until the chickens came for the food, and when one got inside the radius of the chain, the Fox would have chicken for dinner instead of the food I had given it. One thing I noticed in particular was that it seldom missed getting a chicken when it jumped for one; in fact, it never made a jump except the chicken was inside the chain limit."

There is, of course, only one brood to the season. The young are nearly full grown by the end of August, but are still in the old home with the parents. Such quantities of game, dead and alive, have been brought to them during the summer that their front door is now dangerously marked with the bones and feathers of the victims.

A curious characteristic of young Foxes is recorded in the following by W. W. Titus. It is paralleled in several other animals, notably young Deer and young grouse: "Major Val Young and Capt. Billy Young had a Fox chase last week. They experienced no difficulty running the grown Foxes, one giving them a race of 8 hours. All the others started went to earth after a short race.

"They found, however, that their Dogs could not trail with any satisfaction the young Foxes, probably one-third grown. The Dogs would strike their trail and go tearing off in full cry, run over it and circle for a mile, come back to where they lost it and hit it again, and dash off to make a complete loss. They decided the scent was very light, and that the young Fox dodged worse than a Rabbit."[66]

J. G. Millais gives a note on the habit of the she-Fox in England. I believe the same remarks apply to our American Fox.

"Vixens, too, often move their cubs when they are half grown, and take them to a considerable distance, hiding them temporarily in piles of faggots or holes in trees so as to be near their regular hunting grounds.

[66] Forest & Stream, June 1, 1895, p. 444.

This is evidently labour-saving, for then the mother has not to carry large supplies of food to her family from great distances. An instance of this occurred this spring (1904) within a few hundred yards of my house. At the beginning of May a Vixen brought her cubs from some other part of St. Leonard's Forest and took up her abode in a large pile of faggots. She remained here for a fortnight, capturing a large number of Rats and a few Rabbits, which were littered about in all directions near the retreat. By the end of May, the same Vixen had removed her family to a bank half a mile to the east, where she stayed with them for another fortnight. She has now left this part of the forest, and is doubtless working another "beat."[67]

The young probably scatter voluntarily before winter, but it is interesting to remember that in England a systematic effort, called cub-hunting, is found necessary each year, in October, to disperse the families and improve the hunting by equalizing the distribution of Foxes.

I have never seen the young accompanying their mother; indeed, 2 Foxes are the most I have known together.

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[67] Mamm. Gt. Br. & Ire., I, p. 206.

His Winter Way of Life

In the early part of the winter the Fox hunts chiefly at dusk, but the growing scarcity of food increases the need for diligence, and in February and March it may be seen abroad at all hours.

I have often followed a Fox track for miles to learn this hunter's methods. He goes facing the breeze, but turns aside to examine every promising thicket and sedgy hollow. He goes to all the places where he remembers having had good luck on previous hunts; he calls and sniffs at all the signal posts as described in the Wolf account, though to a less degree. He adds his own record to those already inscribed. He trots along ridge after ridge, he seeks out a bare knoll on which he has voided dung before now, and, finding the spot, endeavours to repeat the act. He stops at the slightest click of leaf or twig, freezes to a statue in an instant, holding one foot up in a pose of wonderful grace. Sometimes he stands on hind legs to overlook the grass, or bounds aloft for an observation hop, after the manner of a Jackrabbit. He searches the wind with his nose, he trots on by the hour, missing nothing, and passing from cover to cover, in a somewhat zigzag line, but with a general up-wind course. He sneaks by settlers' homes, looking for luck, and is not above feasting on offal. He looks out sharply for the Dog, and, if pursued, easily leaves his foe behind in a few hundred yards, then sometimes turns and barks in defiance, tempting the Dog to further pursuit. He runs across the fresh track of a Rabbit, follows this for a time, and may even succeed in springing on the crouching Bunny; but the latter is as alert as the Fox, and has the advantage of awaiting approach. Usually it gets into the brush, where the hunter must give up the hunt.

In following the trail of a prowling Fox once, I saw where he had dug out a torpid garter-snake, bitten it nearly in two, and left it lying on the snow, intending, it seemed, to come back for it if he found nothing better.

But, farther on, the track recorded how the prowler had scented two prairie-chickens asleep in a drift of soft snow, had stalked them with nose worthy of a pointer and step worthy of a Cat, had come just above them before they awoke to their danger, and when they burst out of the drift, he had sprung and secured the nearer. Having now abundance of this finest food, he was not compelled to go back for the cold snake, which is never good eating, and on a cold day, would have been a very cold lunch indeed (see Plate C).

PLATE C—FOX TRACKS IN SNOW

A, showing where the Fox, entering at top, came down and unearthed a snake, which he killed. *B*, the second part, showing where the Fox stalked two Grouse hidden in the snow and secured one. The various pauses as well as the touches of the tail are clearly shown.

When satisfied or tired, he lies down for a nap, not usually in a hollow, but on some exposed place—the top of a bank, a boulder, a log, or a stump. Here he curls up in a ball, his blanket is on his back, and his travelling rug is his tail, his big black ears, sticking a little above his tail, are the only things that break the rounded yellow of the ball.

He looks like a yellow stone, and seems to know it. Once while travelling on the Souris in 1882, my brother and myself noticed a yellow boulder, among others, on a ridge. He said: "Look at that; doesn't it look like a Fox?" I said: "No, I see nothing but a yellow boulder." We marched within 30 paces, ourselves, our wagon, and oxen. When 20 yards past, a puff of wind seemed to cause a crack in the boulder. My brother stopped and said: "I'm sure that's no boulder; it looks to me like a Fox." He turned aside, took one step toward it, and at once the "boulder" sprang up and ran for dear life. A Fox indeed—he scurried across a stretch of burnt black prairie, then, reaching a bit of unburnt yellow grass 300 yards away, crouched down in this and watched us again, not, I suspect, because he knew the grass to be a good match with his own colour, but simply because it was cover.

I do not think he was asleep when we passed him, because we had a heavy wagon and the oxen were driven with the usual noise. I believe he was watching over or through his tail, and would have lain still, trusting to escape notice, had not my brother alarmed him by leaving the trail and stepping toward him.

The Fox does not have its regular hours of sleeping any more than of eating, except that it prefers to sleep in sunlight, but its sleep may be broken into a dozen naps, for it curls up when it feels tired and has satisfied its hunger.

Many other scribbling hunters have learned and used to advantage the snow record as a means of knowing the life of a Fox, and even getting his pelt. The following on "Trailing Foxes" was written by J. T. M., and appeared in *Recreation* for Sept., 1897, p. 214:

"Our way of killing Foxes is to track them in the snow and to shoot them while they are lying down or, as is more often the case, on the run.

. . . . . .

"'Here is a good track, Tom; and here is another, both going the same way,' said Billy. Noting one track was large and the other small, we concluded we were after a male and a female and would find them together.

"Following the tracks a short distance, they showed that the Foxes had been looking for a place to sleep. Now we moved forward cautiously, watching to the right and left more than to the front; knowing a Fox always doubles on his track before lying down.

"The tracks approached a deep gully, thickly grown up with trees and brush; a likely place for a Fox, on a cold windy day. Having the wind in our favour, we walked to the edge and looked in. Yes, there they were: two round, red balls, just behind an old worm fence. . . .

"All the way the Fox had been hunting. Here and there, as we tramped along, we read the signs of tragedy. The trail followed a creek for 100 yards, where the bank hung over; a favourite roosting place for small birds. Several long leaps, a spot in the snow thickly padded with tracks, a few feathers, and the tale is told. The tracks crossed a meadow. Here two long leaps to the right, a hole in the snow, a dead Mouse. I wondered by what one of the five senses the Fox located that Mouse. Farther along he caught a Rabbit, after a straight run of 100 yards. After eating half, and burying the rest in the snow, he started off toward an old slashing. We congratulated ourselves, for the chase would soon be over; but the woods were hardly entered when, 200 yards ahead, we saw him sneaking away. The wind was against us. A Fox places great reliance on his nose.

"After him again, for we know he will not go far without lying down. Presently we see him, or think so, 200 yards away, lying by a tree. Billy stays here while I make a detour, getting the wind in my favour, and trying to get close enough for a shot. Imagine my feelings, after 15 minutes of crawling and creeping, to find the supposed Fox only a bunch of leaves.

"Motioning to Billy, we moved on again. Now we find where the Fox left the woods and started across the fields. Ten minutes more and we see him lying under a thorn-apple bush."

A more recent but highly successful hunter in the snow is W. Dustin White, whose article "Snow Tracking the Red-fox" is crammed with good natural history and original observations. It appeared in *Field & Stream*, April, 1917, pp. 476–7, and contains the following helpful paragraphs:

"If I were planning a camping and fox-hunting trip, I should choose a region of abandoned farmland, bordering on the big woods. . . .

"While any winter day, except when the snow is crusted, is suitable for snow-trailing the Fox, the ideal conditions are about 6 inches of snow—a part of which should have fallen during the evening previous. About this depth is required to deaden your footfalls, and more makes rather hard walking. Foxes lay rather low during a storm; consequently if it snowed a greater part of the night, there will be a scarcity of trails in the morning. If the snow be slightly damp, it not only more effectually deadens the sound of your footsteps but also retains more clearly the impression left by the animal's foot.

"As we venture out in search of the first trail, we soon become alive to the fact that we are viewing the face of Nature in a charming mood. Her complexion is of the most pure white, with an occasional rosy blush where the sunlight glistens. The roadside walls are half buried with the soft blanket, the fences draped with the glistening robe and the trees decorated with white festoons. But as we pass the first farmhouse, we notice a straight, precise trail that leads out from behind the henhouse, where Reynard had sniffed longingly of the warm smell of poultry. As we follow the trail, one of the first things that impress us is that the Fox is a thorough-going sort of fellow. Away out across the fields leads the trail, showing that Reynard had poked an inquisitive nose into every nook that promised a morsel of food—here he dug a Fieldmouse from a tussock of grass, there an old dry bone lay by the pasture wall, while ever so many Woodchuck holes were investigated. Down in the edge of the woods he stalked a grouse—stealthily working near in a crouching position, but his spring was a trifle too short or too late, for no blood nor feathers mar the snow. Farther down, where the ground is swampy, his trail runs into a maze of Rabbit tracks, but, by a piece of good fortune, we discover where he had succeeded in catching one of the Bunnies and made a good meal, after which his trail led straight away—a fact which we note with satisfaction.

"Now the hunting trail of the Red-fox may be long and crooked, but once he finds a good meal and puts it where it may do the most good, he soon looks for a comfortable place to curl up and take a much-needed snooze. And, sure enough, as we work along up on the sunny hillside, we notice that he has been investigating such places as sheltered spots at the foot of low evergreens, or the soft centres of rotting stumps.

"Now the real hunt begins. While we may have been travelling quietly, our caution must now be doubled, and we should also take note of the wind and be careful that it does not blow from behind us. Somewhere ahead are as keen a set of eyes, ears, and nose as ever sifts the sights, sounds, and smells of our Northern hillsides, and if we are to work in past such wary sentinels, we must be cautious indeed.

"So we work along, not directly on the trail but always near it, and ever with an eye out for a patch of red fur at the base of some spruce. But no such luck for ours. Instead we come upon a small round hole thawed down through the snow to the leaves and a track over the hill in long jumps.

"Well, what's to do now? Nothing at present! Sit down and keep perfectly still for a little while. There is a bare possibility that the Fox may sneak back to see for sure what it was that started him, and you should be ready to take a crack at him if he should. After a little while

you might light your pipe, if you smoke one, or eat your lunch, but under no considerations should you attempt to follow that trail for at least an hour. If a Fox be jumped this way early in the day he will, nine times out of ten, if allowed to take his time, curl up for another nap. If jumped late in the afternoon, they will usually keep afoot the rest of the day. In such case we must use our knowledge of the country in planning to follow farther.

"But we have now given our Fox time to forget his scare, so we will take up the trail again. Our first surprise as we follow over the knoll is the comparatively short distance that he ran. In just a little way we notice that he has slowed down to a trot, then the trail shows where he has jumped upon a stump to watch the back trail. Then out across the pasture he trots, through a hollow and up on a knoll. Here he stood for some time, his own body concealed behind a bush, and, as we look back from this point, we can plainly see our own trail where it came down the other knoll. So we see the advantage of not hurrying a Fox that has been started, and it is with relief that we notice that he left this post evidently satisfied that he was not followed. Sure enough, in a short time he was seeking another bed."

The Wisdom of Wagush

In all ages of record, the Fox has been held as the standard of cunning, the clever beast that, without great strength or unusual weapons, could yet hold his own against the mighty and the well-armoured, the well-armed.

So deeply has this cunning been implanted and grown as a racial character that it has become instinctive, congenital in the young.

From birth they have a deep-laid fear of every strange or peculiar object, and they early acquire a horror of anything that bears the taint of man. They learn much from their parents, no doubt, but a mere baby Fox, brought up from blind, woolly cubhood, man-handled and bottle-fed, begins at an early age to show his ancestry. One of my own childhood animal memories is of seeing a little woolly Fox cub chained in Fee's Mill, Lindsay, Ontario. I was not yet 6, but I was old enough to delight in the tricks and cunning of the little imp.

Their mode of life is, moreover, a constant sharpener of their wits. The quickness with which they learn to distinguish and distrust the latest devices of the trappers is wonderful evidence of their cunning, perhaps also of their power to communicate certain ideas.

Our American Fox must be very close kin of the European, and a recent arrival, too. For in spite of the fact that he has not had 2,000 years of man-directed hostility to overcome as the price of continued life, he has

yet risen to the hardest condition we have imposed on him, has learned our tricks and our follies, and has so far solved the problems we have thrust on him that he increases and prospers, instead of retreats and dies, as agricultural activities necessarily possess the newer lands.

His sagacity, his race cunning, are shown in four ways: first, in eluding his natural enemies, such as Wolves, Coyotes, Wild-cats, and eagles; second, in capturing his prey under new and difficult circumstances; third, in eluding traps, trappers, and poison; and fourth, in eluding hunters with guns and Dogs.

Against eagles, of course, the Fox's simplest protection is brushwood. In the small timber, the Fox is safe, and very rarely indeed is an old Fox seen exposed on the bare open ground remote from the woods. As a matter of fact, the cubs sleeping or playing in the sun near the home den are as a rule all that the eagles can get. If the cubs were left alone, the eagles would likely get them all, but the ever-watchful mother Fox is to be reckoned with. Very very rarely is an old Fox taken by an eagle. One of these cases is related by W. M—— in *Forest & Stream*, Feb. 9, 1896, p. 114.

Wolves and Coyotes are dangerous only in winter when there is deep, soft snow. The shorter legs of the Fox then put him at a hopeless disadvantage, and once he is started at such times, the Fox's fate is sealed.

A friend of mine at Qu'Appelle, Sask., was witness once of such a Fox chase in the snow. Two Coyotes had got on the trail of the unfortunate Fox, and, realizing their advantage, had followed hard. They must have floundered several miles when my friend saw the red-haired one plunging desperately ahead, with the Coyotes evidently on the point of seizing the victim. The Fox doubled and plunged, then, sighting my friend in the cabin door, took the only chance left. He made for the man, and cowered gasping and trembling at his feet, while the two Coyotes hung back in fear, then fled away, leaving the Fox, the wise old Fox, the winner—saved, for what man at such a time would harm a fugitive who confided to him his life?

Wild-cats are said to kill Fox cubs occasionally, but it must be of rare occurrence, for the Cat is afraid of the old Fox, and the young are never left alone till swift enough to elude any Wild-cat.

The Fox has risen wonderfully to the possibilities of barb-wire fence and chicken wire as means of baffling enemies and securing a meal. One often hears of Foxes "leaping over a 7-foot chicken fence." They do not leap over it—they climb up it like Cats. At this they become very expert and if need be can climb a 20-foot wire fence, as can be seen and proven on any Fox ranch.

Many hunters and farmers in England have told me that a Fox never kills near home. It has no wish for trouble with the neighbours. The barnyard next its den is perfectly safe so far as this pair is concerned.

There is a quaint story of a Fox catching prey in a new way that was imposed by entirely new conditions. I have heard of it from several, but cannot guarantee its truth. The story appeared in the Omaha *World-Herald*, and was reproduced in the New York *Evening Sun*, Dec. 21, 1899.

"A gentleman whose word cannot be doubted and who is not easily deceived, tells the following:

"Very early one morning he saw a Fox eyeing most wistfully a number of wild ducks feeding in the rushy end of a highland lake. After a while, the Fox, going to windward of the ducks, put afloat in the lake several bunches of dead rushes or grass, which floated down among the ducks without causing the least alarm.

"After watching the effect of his preliminary fleet for a short time, the Fox, taking a good-sized mouthful of grass in his jaws, launched himself into the water as quietly as possible, having nothing but the tips of his ears and nose above water.

"In this way he drifted down among the ducks and caught a fine mallard."

The trapper and poison are among the new enemies. These as problems the Fox has slowly solved so that they no longer threaten his race with extinction. As an illustration, though in this case the man triumphed, I give the following experience, related by J. A. Newton in *Recreation* (Oct., 1902, pp. 271–2). He was trapping Foxes and working with the old plan of a baited chaff bed. But one locally famous old Fox robbed the bed night after night, by the well-known Fox trick of nosing out the traps and turning them over, so that they were sprung and made harmless.

"I was at length compelled," says Newton, "to seek advice from Daddy Jenks. 'I know a trick fer sech old chaps as that,' he said; 'I'll go with you and see about it.' After setting the trap so it would spring rather hard, he placed it carefully in its bed, but bottom side up. I marvelled greatly at this procedure, but the old man did not explain it. The following morning we were both anxious to know the result, and, to my surprise, found we had caught the wise old Fox. He had turned the trap over as usual, which brought it right side up, but as nothing came in contact with the pan it remained unsprung. No doubt, thinking danger had been removed, as on previous occasions, the Fox had met his fate while recklessly treading around in devouring the bait. I never saw a more crestfallen animal; he cowered as

we came up, looking as if he wished the earth might open and swallow him." I wish I could add that the victor let the captive go.

When caught by the foot, a Fox will struggle violently, twisting and tearing the foot, sometimes till it is torn off. Some trappers say it will amputate the leg if need be. I have never seen this, but I have known the Fox to bite off the imprisoned toes *below* the trap. This, whether design or accident, is the best thing it can do, as it can then jerk free with the least possible loss and pain.

Raymond S. Spears, veteran sportsman and a pioneer among men who have opened the outdoor world to others, relates an experience of Hy Burke, the Adirondack trapper, in a wit-match with a Fox that he tried to poison.

"Someone," says Hy, "had put out a lot of 'pills' along the old road leading to Black Creek reservoir. A 'pill' is a cube of lard an inch long on a side, hollowed out and filled with crystal strychnine. Driving along the old road, the poisoner had thrown chunks of meat—Porcupines, cow heads, hog lights, whatnot—and on top of the meat in the snow were tossed two or three of the deadly pills. Lured by the meat, the Foxes came to feast, and in coming they showed their far-famed caution. We saw where one had dug down in the snow till he came to a pill, and then left the bait. In another place the Fox had dug down to the meat and gnawed it. Where his track led along the sleigh ruts they showed plainly, and Burke exclaimed:

"'That feller's got a pill. See how he spreads his toes!'

"Nearly 200 yards down the road we found where the Fox had pawed away some loose snow and carefully deposited a pill in the track.

"'Now look at that!' Burke exclaimed. 'That Fox carried that pill till he'd thawed it up in his mouth, and could taste the hand that made it. Then he put it down where Jerry would find it! I bet Jerry don't get that Fox! Not unless it eats a poisoned Fox carcass!'

"Burke said that Foxes would not take bait thrown out by a man on snowshoes for a long time after it was put out."[68]

Fourth—to escape hunters and hounds. When first a Fox, especially a young one, realizes that the hounds are after him, he sets off at full speed, never doubting that his wonderful legs can put him beyond reach of any creature that can run. But he soon realizes that the hounds can run as fast as he, and his only chance for safety is in throwing them off the tell-tale scent. Thousands of stories have been told to show how he does this. Let us illustrate with one or two that are offered by reliable witnesses.

Bachman says: "We once knew a Red-fox that had been chased fre-

[68]Forest & Stream, April 6, 1907, p. 529.

quently, and always escaped at the same spot, by the hounds losing the track: the secret was at last found out, and proved to be a trick somewhat similar to the stratagem of the Gray-fox related in our first volume, p. 171; the Red-fox always took the same course, and being ahead of the Dogs so far that they could not see him, leaped from a fallen log on to a very sloping tree, which he ascended until concealed by the branches, and as soon as the Dogs passed he ran down, and leaping on to his old track, ran back in his former path. So dexterously was this 'tour' performed that he was not suspected by the hunters, who once or twice actually whipped their Dogs off the trail, thinking they were only following the 'back track.'"[69]

To this, W. E. Cram adds: "From time to time, he will go back in his own footsteps for a distance, and then leap away to one side and go off in a new direction. Again he runs along the top of a rail fence or stone wall, or over the wet stones of a shallow brook."[70]

The following clever trick was related to me by Geo. A. M. Williams, of Newburyport, Mass., Jan. 1, 1901:

"A farmer was doing some fall ploughing in the field, and on looking behind him, saw a Fox following him up the furrow. His Dog saw him at the same instant and put old Longtail over the hill, where he escaped. The next furrow covered up Mr. Fox's track, and in a very short time after, the hounds came along, until they struck the ploughed land, when they were lost for keeps. If Mr. Fox knew that his trail would be covered by the next trip of the plough, he was a wise one. I think that he did. We run them so much here that they are as keen as briers."

Another device related to me by an old fox-hunter is well known as the "change-off." In this case, the hunted and hard-pressed Fox darted into a long hollow log where lay another Fox who ran out of the other end, carried on the chase, and, being fresh, was able easily to beat the hounds at their own game.

On another occasion, this man saw the Fox run into a herd of Cattle. When the hounds came bawling along, it so excited the Cattle that they attacked the pack and drove them back in such ignominious defeat that the Fox made good his escape.

W. E. Cram, of Hampton Falls, N. H., has usually something of value to contribute when a Northern animal is under consideration. Discussing the craft of the Fox, he says:

"One of his favourite tricks is to cross over deep water on thin ice just strong enough to bear him, knowing that in all probability the hounds

[69] Q. N. A., II, p. 268.

[70] Am. Anim., p. 269.

PLATE CIX.—LIFE STUDIES OF VARIOUS FOXES
By E. T. Seton

PLATE CX.—COLORADO KIT-FOXES, NATIONAL ZOO
Photographs by E. T. Seton, 1923

will break through and perhaps be swept under the ice if the current is strong enough; more than one valuable Dog has been drowned in this manner, but I have never known a Fox to miscalculate the strength of the ice and break through himself. If the stream is not wholly frozen over, he runs along at the very edge of the deep water, where the ice is thin and treacherous, until he comes to a place where he can jump across to the thin ice that reaches out from the opposite bank.

"Then away he goes across the meadows, headed for some sheltered nook he knows of, where he may curl up in the sun on the warm pine needles and sleep until the noisy hounds, footsore, and apparently all but exhausted, come panting up to awake him. When the snow is very light and dry, and just deep enough to make it harder for the Fox than for the hounds, he has a much worse time of it; but it much oftener happens that while the hounds plunge in up to their breasts at every step, he skips off over the white surface without breaking through."[71]

There is a device that I have several times known the Ontario Fox to resort to when pressed by the hounds; that is, run along the railway ahead of a train and cross a high trestle bridge. On one occasion, I knew of a hound being thrown by the locomotive from the trestle into the river below, minus his tail, but otherwise unhurt. I was told, however, that all were not so fortunate, as some hounds had been killed at the same place in a similar way.

Forest & Stream of Feb. 5, 1898 (p. 113), quotes the *Springfield Republican* for the following incident in "A Massachusetts Fox Trick." "Being pushed pretty hard by the Dogs, the Fox—for he was an old chap and a cunning one—coming to the railroad again, took to the rail to bother the Dogs, and kept that course for more than a half mile without leaving a track in the snow, as far as we could discover. On the iron rail, you know, the Fox leaves but little scent, especially after a train has passed over it. That is when you heard the Dogs. They were just figuring out where the Fox left the rail. The Dogs found it themselves at last without being caught up by a train, as the old Fox no doubt wished, and as we were afraid."

The editor of the *Westerly Sun* writes under date of June 15, 1903: "Two hounds owned by Sylvanus Peck, of Rehoboth, were killed recently by an electric car, on the Providence and Taunton street railway, while they were in chase of a Fox. The Fox ran suddenly from the fields across the track near, and the Dogs, hot in pursuit, ran in front of the car too quickly to prevent the accident."

[71] Am. Anim., p. 269.

These New England Foxes are among the wisest of their kind. Another case is reported from Taunton, Mass., by "Fox Hunter." "A recent report that a Fox in Canaan, Conn., leads the pursuing Dogs to their death by running upon the railroad tracks until a train comes along, when he crosses the rails in front of the locomotive, finds its parallel in the fact that a number of Dogs in this vicinity have been maimed or killed by the same procedure; in fact, I had a young Dog some time ago that was run down in the same way while following a Rabbit. My Dog had his legs broken and had to be killed in consequence."[72]

It is very hard to say how much was intentional on the part of the Fox. The fox-hunters who know the animal say *it was intentional throughout.* Some maintain that it was entirely accidental. It certainly was not necessary for the Fox to know anything about train times, as he could *hear* the train coming miles away. The track is a notoriously bad place for scent to lie, the trestle was a place of difficult footing, like a sloping tree, which often furnishes refuge, or the steep sand bank already noted, where I several times saw the Fox baffle the hounds. He might run to the train, just as I have known a Deer or a Hare run to a wagon or sleigh when flying for its life, preferring the unknown terror to the certain death. Add to this the element of luck when first the Fox made the attempt; success that time would lead him to try again.

Courage

Nearly every writer that ever treated the Fox has lauded his cunning, his fox-craft, and has done it in a superior sort of way, as though, after all, it was low cunning, not the wisdom of a "noble brute." Not one of them in formal treatment has emphasized the high qualities of the Fox, his dignified and gentle fatherhood, his unflinching front when faced with a cruel death, his heroic courage. I rejoice then in this set occasion on which I can tell of it, confirmed by my witnesses.

W. E. Cram says: "I have more than once seen a Fox turn and drive the hounds back when they got too close."[73] Think of it! A 10-pound Fox, all alone, attacked by two or more 75-pound hounds that have the backing of men with guns. Think of it, and get new light on the character of the "shifty" Fox!

That nerve and self-possession are among the gifts of the European Fox is shown by the following from Brehm's "Life of Animals." "Once a Fox, which was being hunted by hounds, and had twice heard the shot

[72] Forest & Stream, Dec. 31, 1910, p. 1058.

[73] Am. Anim., p. 269.

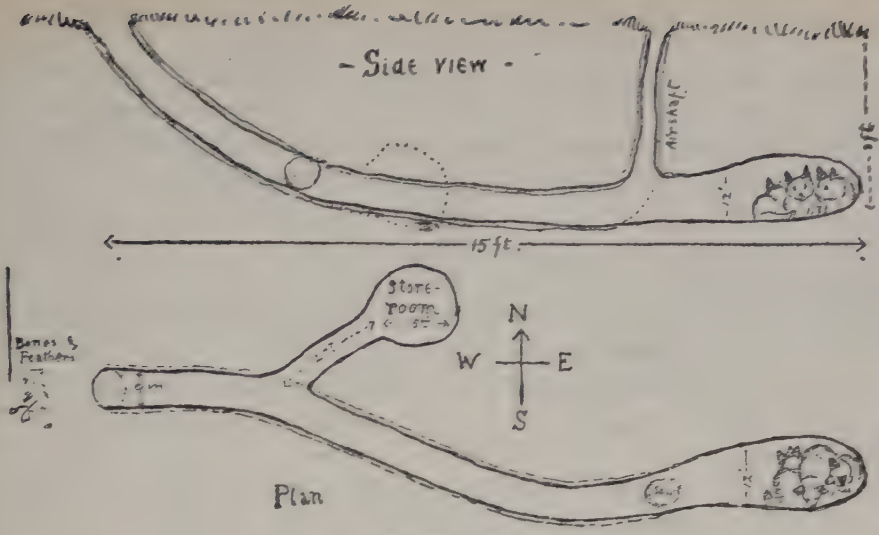

PLATE CIII

Side view or elevation, and plan of the fox-den opened by Geo. L. Fordyce

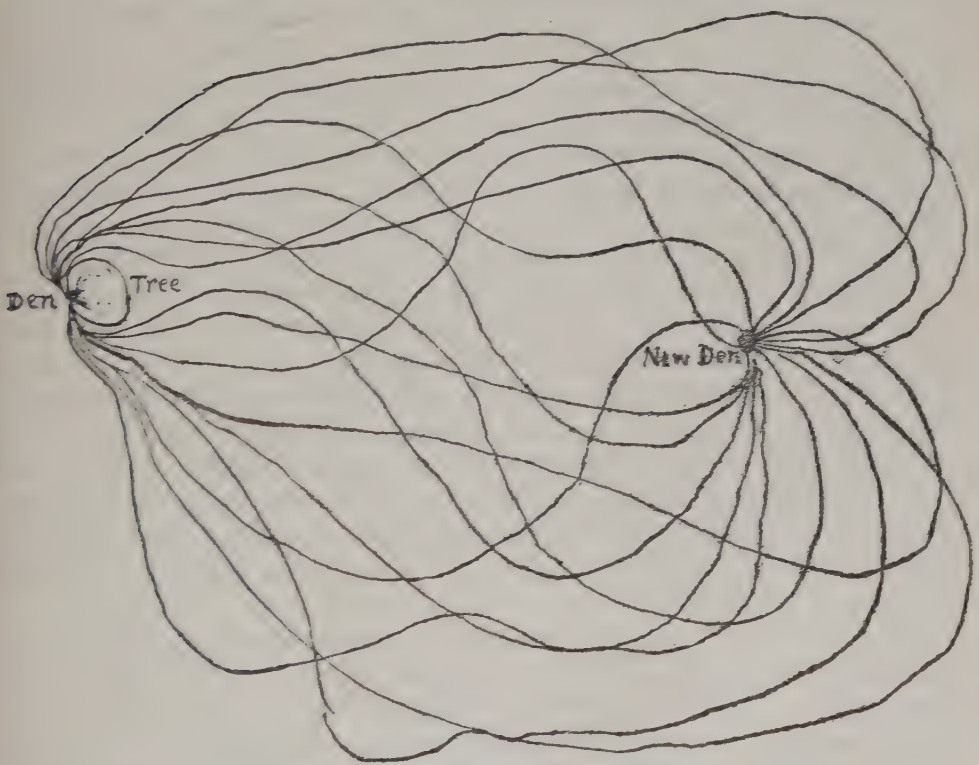

PLATE CIV—THE MOTHER FOX'S TRAIL

Diagram of fox-tracks (by G. L. Fordyce), showing approximately the tracks left by the mother Fox in moving her brood from the hollow tree to the new den

buzzing by, seized a sick Hare in his flight and carried it with him for a considerable distance. Another was surrounded in a field; he came out, attacked a wounded Hare, killed it before the eyes of the huntsmen, rapidly buried it in the snow, and then fled directly through the line formed by the sportsmen."[74]

This, of course, refers to the European Fox, but may be accepted as sidelight on our own.

These cases show, not only the nerve of the much hunted beast, but also the dominance of the storage instinct.

The unquestionable evidences, however, of superb courage, of the triumph of mind over matter, are to be seen in these instances given by American hunters.

C. M. Stark of Dunbarton, N. H., writes, Dec. 20, 1898, to *Forest & Stream*, some unusual experiences with a dog-Fox, a small one, as it was found ultimately to weigh only $11\frac{1}{2}$ lbs. With the assistance of an experienced hound, Stark had started a Fox. The hound "became very much excited, and for some time acted like a fool, losing the track and trying to run the wrong way. I got him straightened out after a while, but in the meantime the Fox had got quite a lead, and had been on stone walls, over bare ledges and such places, and the Dog had to work hard to follow the track. As it was a pretty open country with large, bare hills, I could watch the Dog, although at some distance most of the time, and he worked well, getting mixed up now and then with some other tracks. I did not try to help him out, as I wanted to see just what he could do.

"After a while he jumped the Fox, and evidently was very close to him at the time. For a few moments after jumping him, the Dog barked and yelped very fast, and I saw both Fox and Dog. They were in an open pasture about 50 yards apart, in plain sight of each other. Suddenly the Dog stopped barking, and Fox and Dog cantered along slowly for about 50 yards, when the Fox stopped, turned around, and looked at the Dog. The latter also stopped. Then the Fox sat down and so did the Dog, some 50 yards apart, looking at each other. This was not very entertaining to me, as I wanted to shoot the Fox, but he was at least 3 gunshots away.

"After a while the Dog got up, put his tail between his legs and sneaked off, heading toward home. I then called the Fox up and shot him. As I was about to take off his pelt, the Dog came to me, having followed my track from where I left the road. He seemed very glad to see me, and

[74] Tierleben, Säugethiere, III, 1915, p. 173.

when I showed him the dead Fox, he bit and shook it a little, and did not seem at all afraid of it."[75]

Noble animal, that hound! Seventy-five pounds of Dog, and 11½ pounds of Fox! The hound dared not face the living Fox, but fearlessly bit and shook the pelt. How heroic!

The next testimony at hand is still more positive in character and still more satisfactory in conclusion. B. A. Eastman, of Barre, Vt., had bought some fancy-bred Fox hounds, most of which, however, showed a yellow streak. The best of them figured in the following incidents, related in *Forest & Stream*, May 6, 1899, p. 353.

"I had a Fox get out from its enclosure during the night. The hound was put on the trail and soon started it, running to a large field, the hound was not more than 4 rods behind, when, quick as a flash, the Fox turned and tackled the Dog. The Dog threw the Fox and held until taken away uninjured. This may explain why at times a Fox is caught by a hound when the chances of escape are easy."

On another occasion "we saw the Fox cross a field and enter the timber with the hound some 50 rods behind. In a short time we heard the Dog baying as if the game had holed. On going to the Dog we found he had caught and was barking at the Fox, not having the courage to kill it. Nor could the Fox get away. This Fox was not injured in any way, and the trailing was on bare ground.

"This would have remained a mystery, as did Mr. Stark's hunt, had I not had a similar experience a few years ago, which occurred in sight. I saw the hound start a Fox from under some shelving ledges in the open pasture. The Fox ran some 50 rods, coming within 20 rods of my stand, when it stopped and bristled up, with its ears lying flat on its head (much like a Cat on the approach of a Dog), and stood waiting for the Dog. The hound trailed up within a few feet of the Fox, but had not the courage to kill it. After a moment the Fox trotted away, the Dog in pursuit. I saw the Fox several times during the next hour. The hound was always 20 or more rods behind."

"Safety first" was evidently his motto, and I, for one, rejoice to think that that heroic Red-fox made good his escape.

The Lasting Endurance of the Fox

It is not my plan to record hunts in which the men or the Dogs appeared to advantage, or returned victorious. The wild animal is my hero.

[75] Forest & Stream, Dec. 31, 1898, p. 532.

I wish to make known his fortitude, his steadfastness in the face of the most appalling odds. I did not intend to give any fox-hunts, as ordinarily understood. Yet I feel justified in quoting the story of "Boston and Baldy," which appeared in *Recreation Magazine*, July, 1898, pp. 3–7. The hunter who tells it, hides modestly under the name "Herb." I am assured by the editor, G. O. Shields, that it is true, and give it as it was told, but a little condensed, and in the last paragraph, changed to fit the findings of another witness.

The Story of Baldy

In old Virginia, on the James River in the late '80's, there lived Baldy, a famous Red-fox, known to all the hunters about by his great size and the big white patch on his cheek, from which he got his name. Every pack in the country had tried its mettle with Baldy, and had come back humiliated with failure. He was too strong, too long-winded, and too wise for the best of them.

In the December of 1887, the teller of this tale was back in Baldy's country, and had brought with him a new hound of illustrious pedigree, a thoroughbred, with the big mild eyes, the long, soft ears, and the foghorn voice that tell of bloodhound stock. The Dog was young, but had been in one or two hunts. In these he had done well but had given no evidence of unusual power.

One morning an hour before daybreak, a dozen hunters were in the saddle, and, blowing their horns, were off to the lowlands with their 27 superb foxhounds.

After one or two false starts by different Dogs, Boston, the blue-blooded, sounded a vibrant note that at once gripped the hunter-sense of the men.

Now let us take the story as the hunter himself told it.

"I at once 'hushed' the pack to him, and they began working up the river on a cold trail, but warming it at every jump.

"Following it a mile or so, still keeping to the bluffs, we came to a large gully down which the pack turned into the low grounds.

"As they reached a piece of corn stubble, they broke into full chorus. 'He is up and gone!' was the cry. What a moment of excitement! What a picture was unfolded to our eyes as from the bluffs we could see the pack straightening out along the false bank! A few hundred yards ahead of them, a flock of Crows were darting at something which we concluded was the Fox.

"The spell was broken by Captain D—— putting spurs to his Horse and yelling, 'Ride like the devil, boys, he will cross at the Point!' And ride we did. We cut a swath through the sassafras brush, that looked like the track of a tornado. At the edge of an opening, we paused to listen. The pack was almost out of hearing, still going up the river; but in a few moments, the Fox having doubled, we heard them returning. The word was passed,

'Keep still and we will see him!' When the pack was about opposite, and but half a mile away, out popped the Fox within 50 yards of us. We were in luck. It was old Baldy himself, patch and all. Away he went, his brush standing straight to the wind.

"Now all was commotion. Whose Dog was leading? we queried. What a chorus came up the hill! Is there any music to be compared with that of a pack in full cry?

"The first to appear in sight was Boston, his head up, and running like the wind. He was at least a minute in advance of the others, and was only opening once in each hundred yards. The rest of the pack was well bunched. They were led by my Dogs Tempest and Colonel, who were running neck and neck. We swung in behind them, cheering like mad. After 6 or 8 miles of very rough riding, we heard the Dogs stop. There were only 4 of us up then; the rest having been thrown out. We rode up to where we expected to find Old Baldy's torn and mangled remains, but found instead that the Dogs had lost his trail.

Here we circled for a while without a strike, but at last Forest, an old Coon Dog of mine, 'hit it off.' That darned Fox had taken to fence-running. Forest followed him along the fence for at least half a mile. Then we again lost the scent in a field where Old Baldy had run through a flock of Sheep. In vain we circled the enclosure. We thought we had lost him for the day and decided to call the Dogs off and return home.

"As we reached the main road we met an old Negro who said he had seen a Fox cross the road about a mile above. We rode up there and some of the Dogs opened, but the scent was cold. We kept up a constant cheering to encourage the pack. After 10 or 15 minutes spent in this way, and just as we were about to give up, we heard a series of squeals. Looking up we saw Old Baldy flying along the road, with Tyrant, Boston, and Black close behind him.

"'He is ours!' I yelled. 'He can never get away from those Dogs in a sight race.'

"But I did not know Old Baldy yet, for he simply faded away before the Dogs.

"In a moment we had the pack all in. Away we went again as fast as our tired Horses could take us. We kept with the Dogs for nearly an hour, but at last they ran out of hearing. Following more slowly, we met a friend who asked us into his house to partake of refreshments. He also had the kindness to stable our Horses, and generously lent us fresh mounts.

"After resting half an hour, we again moved up the river, hoping to meet the pack returning We kept on, mile after mile, but did not get

within hearing again. We met 8 or 10 of the oldest and youngest Dogs, who had quit and were coming back.

"About sundown we rode to a large plantation, and inquired if the pack had been seen. We were told that both the Fox and Dogs had passed an hour before. The Fox had a long lead, and was running well, with his brush still to the wind. We were nearly 35 miles from home; so we decided to remain where we were, if we could be accommodated. The owner of the plantation invited us to remain over night. Putting up the Dogs and Horses, we repaired to the house, where we demolished a substantial supper. As we were about retiring, one of the servants came in and told us there were some Dogs going down the river, howling. We took our horns and going out on the lawn, blew the Dogs in, putting them with the rest.

"About 6:30 the next morning, as we were finishing breakfast, a servant came running in with the information that a Fox with one Dog close behind him, and 2 others some distance after, had just gone down the river.

"Bidding our host good-bye, we saddled our Horses and went on down to the low grounds. We did not hear or see anything of the chase until we arrived at the place where we had left our Horses the day before. While waiting the saddling of our then well-rested mounts, one of the Negroes said he had seen Old Baldy and 3 Dogs a short time before. The Fox was almost played, for his brush was dragging the ground. Our host having joined us, we rode on at a smart pace. A mile or so farther on, I saw by their tracks that Dogs and Fox had again gone to the bluffs. Soon we came up to Colonel, who was staggering along, completely worn out. I took him up on my saddle, and carried him onward. Two miles farther we overtook Rattler going down the road, howling every few yards. Bob took him up in front of him. Both these hounds were badly broken up, and *had worn the pads from off their feet.* A little later I heard a hound give tongue away down in a bottom to our left. I recognized it as Boston's cry, but it was a very weak and faltering note. Leaving the Dogs that were with us in an old tobacco barn on the road, with a Negro to watch them, we rode down to the bottom. There in a patch of briars in a small clearing we could see, by the shaking of the briar tops, the position of both Fox and Dog. They were about 20 yards apart. The Dog had ceased giving tongue except when cheered.

"Leaving our Horses, we went down along the edge of the path which was about an acre in extent. For an hour we saw neither Dog nor Fox. They kept doubling near the centre, but at last Old Baldy stepped from cover a few yards above us. He passed within 10 feet of us without even raising his head. His tongue, greatly swollen and almost black, hung from

his mouth. His brush was covered with mud, and was tightly tucked. A few yards away a large tree trunk had fallen across a path; this the tired Fox tried in vain to climb over. As he slipped back Boston came out of the bushes and saw him. The Dog raised his head and uttered one clear, long-drawn note, a cry of triumph, more expressive than words. As Boston staggered toward him, Old Baldy suddenly fell to the ground, where he lay limp and motionless. When within a few feet of his quarry, Boston stumbled and fell. Then he got up, staggered to the Fox, closed on him, and gave a feeble shake."

Gripped in that weak, final clutch, they went down together. Their poor, feeble struggling ceased as the men looked on, and together the two passed away to the Happier Hunting.

So ended one of the longest chases ever run. A day and a half it lasted; it covered not less than 150 miles in all, and was, at one time, fully 50 miles from the place where it began.

Without desecrating Baldy's body by removing the brush, they buried him with the hound. Side by side they lie on the spot where the long chase ended.

A noble hound! How the hunters did glory in him! But never a word had they for the nobler and gamier little Fox.

References for Red-fox

1849—Quadrupeds of North America, by Audubon & Bachman, I, pp. 45–54; II, pp. 263–71.
1897—Enemies of Poultry, by B. H. Warren, M. D., pp. 376–414; 1 ill.
1902—American Animals, by Witmer Stone & Wm. E. Cram, pp. 264–72; 6 ills. N. Y.
1903—Mammals of Pennsylvania & New Jersey, by Sam. N. Rhoads, pp. 145–48.

LIFE XIII—THE KIT-FOX

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Kit-fox or Swift

Vulpes velox (Say)

(L. *Vulpes*, a Fox; *velox*, swift)

Canis velox Say, 1823, Long's Exped. Rocky Mountains, I, p. 487.
Vulpes velox Audubon & Bachman, 1851, Q. N. A., II, p. 13.

Type Locality—Vicinity of Plum Creek, So. Platte River, Colo.

French Canadian, *Rénard des prairies, Rénard vif.*
Yankton Sioux, *Taghn-kay-ha.*
Ogallala Sioux, *Mee-yah'-chah.*
Mexican, *Coyotíto.*

One of the Indian names of the species is said to mean "lousy thing," because it is pestered with lice.

In addition to the characteristics of the genus *Vulpes*, the Kit-fox has the following:

Size. Length, 26 in. (660 mm.); tail, 9 in. (228 mm.); hind-foot, 4 in. (102 mm.).

Weight. A full-grown specimen, from Medicine Hat, Sask., weighed $4\frac{1}{4}$ lbs. One which I took at Clayton, N. M., weighed 5 lbs. 10 oz.

Colour. General colour, pale buffy-yellow, becoming a deeper yellowish brown on the back of the ears across the lower neck, on the outside of fore-legs and back of hind-legs; below, it is nearly white; on each side of the snout is a black spot; the back is covered with a beautiful silvery-gray mantle in which the gray-brown under-fur is peppered and frosted over with conspicuous white and inconspicuous black tips of the long hairs; this silver-tipping is continued on to the snout. The tail is warm yellowish-gray above, strong yellowish below; the *tail-tip is black.* The tail gland is marked by a black spot, as in the other species. *There is no black on the ears.*

It may be distinguished from its nearest relatives, the Big-eared Swift, by its yellower colour and shorter ears (see Plate CXI).

Races

Two races are recognized:

velox Say, the typical form. T. l., South Platte River, Colo.

hebes Merriam, larger, paler, and grayer. T. l., Calgary, Alberta, Canada.

Fur

The fur is of little commercial value. At Lampsons' sales in London, 1905, a total of 5,129 Kits were sold.

In the March sale of 1906, the number fell to 1,404, 5s. 6d ($1.32) was the highest price paid, and 1s. 3d (30 cents) the lowest.

In the Canadian Government Fur Lists, the Kit-fox is entered as "Fox, other," and the number taken:

1919–20 . . .	386 . . .	value $5,549; average $14.63
1920–21 . . .	61 . . .	value 258; average 4.23
1921–22 . . .	214 . . .	value 1,311; average 6.21

These came chiefly from Alberta with a very few from British Columbia. In Saskatchewan and Manitoba the species is extinct.

Range and Haunts

This diminutive Fox, no larger than a House-cat, is a characteristic native of the Saskatchewan or upper Campestrian region.

In Manitoba, it was formerly found in the Pembina Hills and westward to the Souris. Alexander Henry, trading on the Red River in 1800–08, had one or two Kits brought to him from Pembina Hills, or, as he calls them, Hair Hills, nearly every season. One year, 1804–05, he had 57; of these 26 were from Pembina Hills and 31 from Salt River.[1] In 1873, Dr. E. Coues found Kit-foxes common along the Souris River at the Boundary Trail.[2]

The Kit-fox is strictly a prairie animal, harbouring in burrows and never venturing far from them, so that it is the most subterranean of our Foxes.

Mating, Dens, and Young

Nothing is known of its mating beyond the fact that the creature pairs and that the pair continue together all summer, probably for life, as the male is active in the care of the young.

One of my guides, Lee Hampleman, of Meeker, Colo., tells me that in 1897, when on Pawnee Creek, Colo., he found a Swift's den. It was reached by a tunnel about 9 feet long and was 5 feet from the surface.

[1] Journal, pub. 1897, p. 259 (See Lynx References).

[2] U. S. Geol. Surv., 1878, vol. IV, bull. 3, art. XXV, p. 547.

The chamber was nicely lined with grass and contained 5 young ones. "Just the cutest, prettiest things he ever saw."

These were taken home to the ranch and easily raised, but they never became tame. Both parents were seen about the den.

Prof. John Macoun relates that in Alberta, June 16, 1895, he saw 2 old Kits and 5 young sitting on a prairie knoll. His Dog rushed at them; the young dived into a hole, and the parents busied themselves leading the Dog elsewhere.

An interesting account of a pair of Kits that lived near his ranch house has been given me by R. W. Cowan, of Cochrane, Alta. They were such beautiful and playful creatures that he rather encouraged them until they began to kill chickens, whereupon they fell from favour and paid the extreme penalty. The family consisted of 2 old ones and 5 young. The latter began to run in the month of May. The old ones were seen together the year around, and during May the father certainly lived in the den with the family.

Habits

These Alberta Kits were known to prey largely on Mice, and when there was snow on the ground, they several times showed great cleverness in catching the prairie-chickens that slept in the soft drifts.

At one time the Kit-fox was believed to be the speediest four-foot on the Plains. This, however, proves to be an error. It is very swift, no doubt, but a small animal always appears to be going faster than it really is, and the rapidity with which it gets up speed and disappears into a hole when startled helps to give a wrong impression of its velocity. In the scale of speed, I should place it a little higher than the Coyote.

In captivity it is easily managed and breeds freely, yet continues shy. Audubon and Bachman relate of a captive specimen: "He drank more water than Foxes generally do, seemed anxious to play or wash in the cup which held his supply, and would frequently turn it over, spilling the water on the floor of his cage."[3]

The End

Exquisitely beautiful is the little Swift-fox when seen on his native plains, in all the glory of his sleek autumnal coat. Harmless as a Rabbit is he—harmless to man and mankind's interests; and yet he is going fast with all the other innocent and lovely wild things. Yes, faster than most, for he is the least cunning of our Foxes—so guileless that he readily takes the poisoned baits used nowadays for killing Coyotes.

[3] Q. N. A., 1849, II, p. 16.

But other and even deadlier forces are at work.

I have before me now the current issue of a well-known sporting magazine. It consists of 8 articles (14 pages) on how to destroy game, etc.; one article (2 pages) on how to preserve ducks; 2 articles totalling 5 pages on camping. Thirty-two pages are devoted to announcing new devices for the destruction of game and wild life, including 50 advertisements of various Dogs trained to kill or help kill game with new and increased effectiveness. This publication is an accurate index of the thought and methods of to-day.

One hundred years ago the balance turned. Then the total of man's destruction became greater than the reproductive power of the game animals. And yet, we have yearly added to that destruction, and foolishly we wonder why the wild life goes so fast. Now is the time for a decision. We must either abolish repeating weapons, high-power guns, steel traps, poison, Dogs, automobiles, and aeroplanes in all pursuit of game and harmless creatures, or accept the desolation of our woods and wilds, that at the present rate will certainly be complete within a few years.

PLATE CXII.—DESERT FOX
Photographs by Biological Survey, U. S. Dept. Agriculture
Taken by Dr. T. S. Palmer

PLATE CXIII.—GRAY-FOX, IN PHILADELPHIA ZOO
From photograph by E. T. Seton

LIFE XIV—THE DESERT FOX

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Desert Fox, Desert Kit-fox, Swift Fox, Big-eared Fox, Long-eared Fox, Arizona Swift

Vulpes macrotis Merriam

(L. *Vulpes*, a Fox; *macrotis*, from Gr. *macros*, big; *otis*, ear)

Vulpes macrotis Merriam, 1888, Proc. Biol. Soc. Wash., IV, p. 136, Feb. 18

Type Locality—Riverside, San Bernardino County, Calif.

Mexican, *Zorra*

When seen alive, the Desert Fox seems much like the Kit-fox, but it is usually paler in colour, and has conspicuously large ears. It is easily distinguished from Gray-fox and Red-fox by general pale colour, small size, and the absence of any pure black or pure white on its coat.

I can find no definite colour feature that will always distinguish it from *velox*. Both have the same sandy or buffy white general colour, which is intensified on the legs; and both have a mantle of peppered gray. But the *velox* is a more strongly coloured animal; and *macrotis* has much larger ears. In size, they are about the same. No doubt the present will be proven a mere race of *velox*.

Size. Total length, about 30 to 33 in. (760 to 830 mm.); tail, about $11\frac{1}{2}$ in. (292 mm.); hind-foot, about $4\frac{3}{4}$ in. (121 mm.); ear from crown, about $3\frac{3}{4}$ in. (95 mm.), instead of $2\frac{1}{8}$ inches as in the northern Kit-fox. Thus its ear is half as long again as that of a Red-fox, which weighs 2 or 3 times as much; and nearly twice as long as that of its nearest relative, the northern Kit-fox. (See Plate CXI.)

The ♀ is somewhat smaller, being about $26\frac{1}{2}$ in. in total length.

Weight. About 4 lbs.; but a large ♂ from Cliff, N. M., was $5\frac{1}{4}$ lbs., and a *velox* from Clayton, N. M., was 5 lbs. 10 oz.

Colour. In general, of a soft, buffy yellow, which becomes deeper on the ears and outsides of the legs, paler on the under parts, and pure white on chin, throat, and belly. Head and mantle, peppered gray, with warm under-fur showing through at places. The tip of the tail and the spot marking the tail-gland on the base above, dark brown; whisker bed, dusky.

Sexes alike.

Plate CXI. Desert & Kitfoxes, compared E.T.S.

Races

The following closely related forms have been recognized:

macrotis Merriam, the typical form. T.l., Riverside, Calif.
neo-mexicanus Merriam, a large, yellowish animal. T. l., San Andreas Range, N. M. (about 50 miles north of El Paso, Tex.)
mutica Merriam, a large, richly coloured form. T. l., Tracy, San Joaquin County, Calif.
arsipus Elliott, like *macrotis*, but paler and smaller. T. l., Daggett, San Bernardino County, Calif.
devia Nelson & Goldman, similar to *macrotis*, but much darker; usually blackish on sides of nose and under jaw; pelage shorter. T. l., Llano de Yrais, opposite Magdalena Island, Lower Calif.

The English zoölogist, St. G. Mivart, considers that all of these are merely geographical races of the Northern Kit-fox (*Vulpes velox.*)

Its most conspicuous peculiarity is its large ears. It is interesting to note that the similar but larger environment of Africa has produced in the Fennec exactly the same thing on a larger scale.

A parallel exaggeration of the ears is seen in the desert forms of Mule-deer, Jackrabbit, and Rockmouse.

This beautiful creature, though not rare in its region, is so seldom seen in daylight that it long remained unknown. Its first introduction to science was in 1888 as already noted.

Range and Food

On the Great Mohave Desert I found the Desert Fox common; that is, I found its foot tracks common every morning. And the abundant small game of the chaparral and creosote country evidently supplied it with plenty of food. What evidence we have, shows that it preys on Kangaroo-rats, Mice, and Ground-squirrels, but it would not be true to the family tradition if it did not add to this list birds' eggs, reptiles, insects, and fruit.

Voice and Habits

Its voice is often heard across the cactus plains on the still starry nights, sounding much like the screech of one of the owls. Though at other times it reminds one of the Red-fox's bark—on a small scale.

MAP XII. RANGES OF THE KIT-FOX AND OF THE DESERT FOX

By E. T. Seton with assistance of the Biological Survey, 1923

The tinted area shows the ancient range. The present range is much smaller. In the northeast, the species is exterminated in large areas. The two forms probably intergrade in the South.

In all its habits it shows a close kinship, if not an absolute similarity, to the Kit-fox. It is shy, but not very cunning, and is all too easily taken in a steel trap.

E. W. Nelson gives a charming picture of this child of the arid wastes in its native surroundings: "The Desert Fox," he says, "is a beautiful species, slender in form, and extraordinarily quick and graceful in its movements, but so generally nocturnal in habits as to be rarely seen by the desert traveller. On the rare occasions when one is encountered abroad by day, if it thinks itself unobserved by the traveller, it usually flattens itself on the ground beside any small object which breaks the surface, and thus obscured will permit a horseman to ride within a few rods without moving. If the traveller indicates by any action that he has seen it, the Fox darts away at extraordinary speed, running with a smooth floating motion which seems as effortless as that of a drifting thistledown before a breeze."[1]

Den

The description of a den would answer quite well for both species. Those that I saw on the Mohave Desert were out on the level ground, or sometimes in a little mound. The entering burrow, or in some cases burrows, were about 8 inches in diameter, and went down at an angle of about 45° for a distance of 8 or 10 feet, when it reached the nesting den, in which, with little or no lining, the mother made her bed and raised her young.

A den which I examined near Baboquivari Mountain, Pima County, Ariz., Jan. 21, 1923, was in a low mound out on the open plain. It had 3 entrances, respectively 6 x 9, 8 x 8, and 8 x 8-inch calibre, arranged in a triangle of 8-foot sides.

This Fox is peculiar in that it seems to use the burrow as a home the year round. I have many observations pointing to this conclusion; they show that the pair live together in the den during December and January at least, as well as the breeding season, February to June. Observations covering the rest of the year are needed.

It is possible that this habit is due to the necessity of a refuge from Coyotes. It is believed that for 100 yards or so this little Fox is the swiftest quadruped on the plains; hence, the name "Swift"; but it is essentially a sprinter, and in a mile race, the Coyote would probably win. Hence, the need for a handy burrow too small for the Coyote to enter.

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[1]Wild Animals of North America, 1918, p. 420.

Mating, Young, and Blameless Life

The mating season is believed to be about the first of February. Prof. Chas. T. Vorhies writes me that on Feb. 6, 1918, he secured a female "which contained 3 small embryos, each about $\frac{5}{8}$ inch in length."

The little ones are born about the middle of March and are from 3 to 5 in number.

Vorhies writes me further of a family that he observed on the Range 35 miles south of Tucson, Ariz.:

"On April 28, 1918, while preparing for the fencing of experimental areas on the Range Reserve, a Swift was observed at a distance of only 100 to 150 yards, watching the two of us who were present. I secured the rifle from the car at a little distance away, and crept toward the place, finding, to my surprise, that the animal was lying as if asleep at the mouth of the burrow. This was about 4 P. M. I fired and killed the animal; it proved to be a male.

"The area about the mouth of the burrow showed plainly the presence of a litter of young, and I was glad to know that I had not killed the mother.

"This burrow was occupied for some weeks, but later in the summer was abandoned, probably as a result of the proximity of the fencing operations and the disturbance of the family by the shooting of the male. The fence passed within 25 or 30 yards of the den. Being new to the Range, I did not fully realize the unusual opportunity afforded by this den. Under similar circumstances now, I would leave the entire family undisturbed for close observation. I have not had the good fortune to again locate a Swift den."

The analogy of other Foxes leads one to believe that the male is a devoted parent, faithfully doing his duty by the young, and helping his wife with food when she is unable to hunt. But all of these matters have been little observed, and good service can be done by the young naturalist of the Southwest, who will make for us a fully detailed life-history of the beautiful little Desert Fox.

PLATE CXVIII—GRAY-FOXES IN PHILADELPHIA ZOO
Photographs by E. T. Seton, February 7, 1924
In No. 2, they were quarrelling

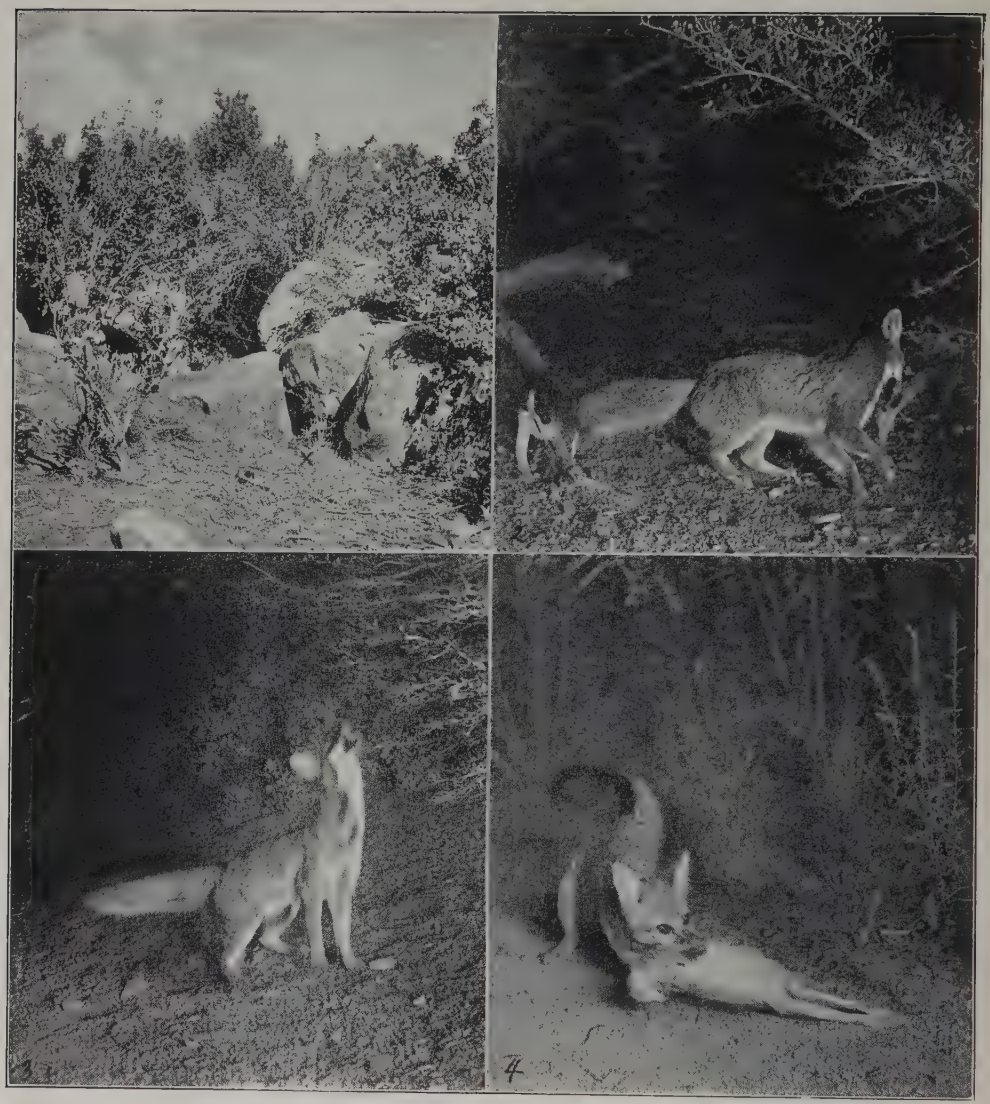

PLATE CXIX.—GRAY-FOXES

Photographs taken in Southern California by Donald R. Dickey
No. 1.— Den of Gray-fox (*californicus*), Ojai Valley, Ventura Co.
Nos. 2 & 3.—Flashlights of the same, Topa Topa Mt., Ventura Co.
No. 4.—Flashlight of *scotti*, near Laguna Dam, Imperial Co.

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Twixt Cat & Fox.

Gray-fox, Virginian Fox, Tree-fox, Mane-tailed Fox, Grayback, or Colishé

Urocyon cinereoargenteus (Schreber)

(Gr. *oura*, tail; *cyon*, Dog, "dog tail," from the tail which has a concealed mane of stiff hairs without any soft fur intermixed; *cinereoargenteus*, ashy silvered)

Canis cinereoargenteus Schreber, 1775, Säugthiere, III, pl. 92.
Urocyon cinereoargenteus Rhoads, 1894, Am. Nat., XXVII, p. 524, June.

Type Locality—Eastern North America

Mexican, *Zorro*[1]
Apache, *Colishé*[2]

The genus *Urocyon* (established as a subgenus by Baird, 1857) of which the Gray-fox is the type, differs from *Vulpes* chiefly in the facts that it has "tail with a concealed mane of stiff hairs, without any soft fur intermixed [a feature common in some degree to all the American *Canidæ*]; muzzle, short; temporal crests, always widely separated. A supplementary tubercle on the lower sectorial. The under jaw with an angular emargination below. *Urocyon*."[3] Each of the characters, however, is found also in Vulpes though in a rudimentary form (see pp. 477 and 481).

Both in his Pacific report (1857) and in his Mexican Boundary Report (1859) Baird treats this Fox as *Vulpes virginianus*, that is, he did not consider its characters strong enough to warrant its being put in a separate genus, though he suggested the name *Urocyon* for the "group."

The tooth formula is as in *Vulpes*.

When seen alive, the Gray-fox looks like a common Red-fox, wearing a grizzly gray overcoat and cap; but his tail is more or less black and has a *black tip;* on each side of his snout is a black whisker-bed.

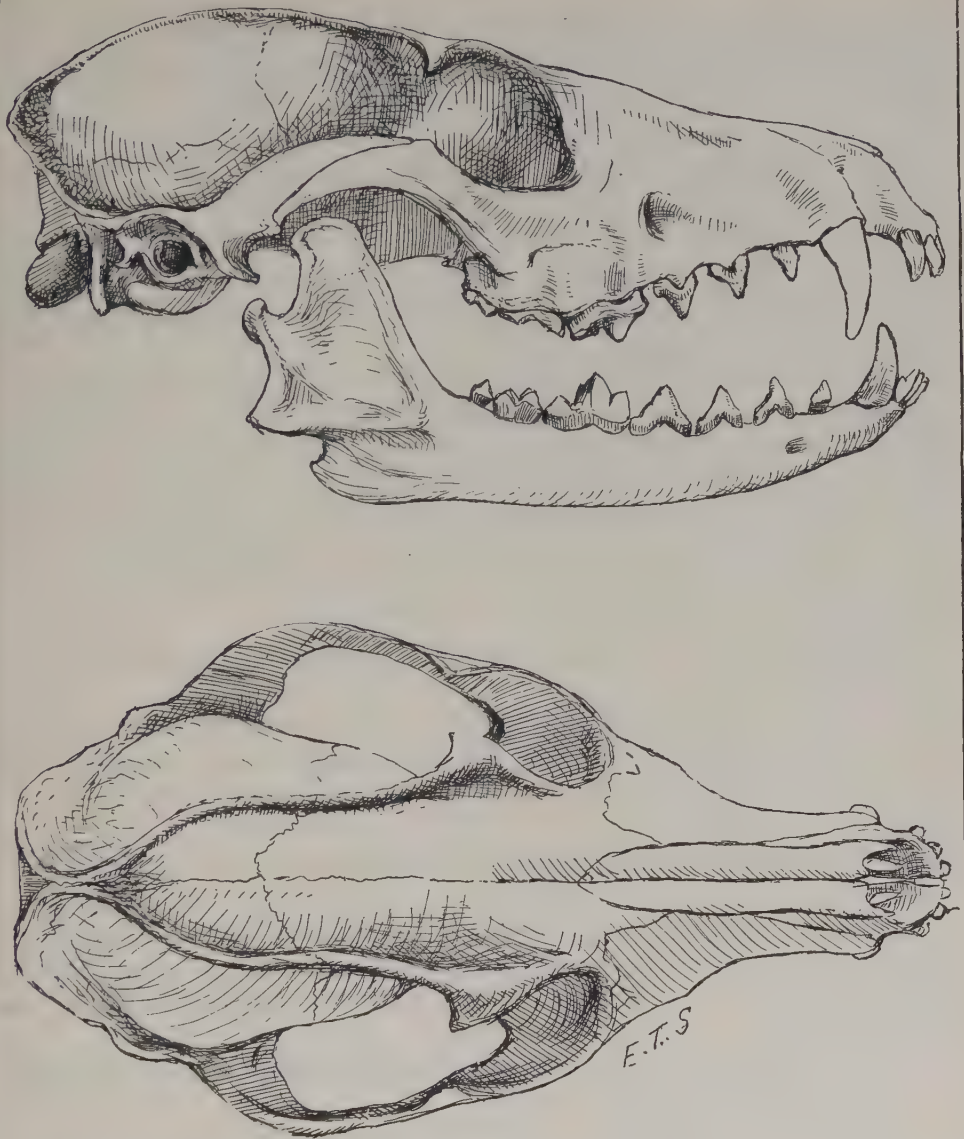
The Red-fox is easily known by its bright reddish orange coat and black gloves and boots, black ear backs, and white throat and *white tail-tip*.

The Kit-fox and its big-eared kinsman, the Desert Fox, are known by

[1] C. B. Kennerly: Baird's Mamm. Mex. Bd., p. 17.

[2] As above.

[3] Mamm. Pac. R. R. Rep., VIII, 1857, p. 121.



Genus Urocyon

Plate CXIV. Skull of Grayfox ♂ (californicus)
American Museum 30208

their small size and soft buff colour, slightly silvered with gray on the back; and by the black tail-tip. Like the other two, the Kit and Desert Foxes have each a dark whisker-bed on each side of the muzzle.

To the generic characters, the Gray-fox adds the following:

Size. Total length, 39 to 41 in. (991 to 1041 mm.); tail, 11 to 12½ in. (280 to 318 mm.); hind-foot, 5 to 5½ in. (127 to 140 mm.).

Weight. Probably about 8 lbs. but not recorded. Donald R. Dickey reports "a young, but apparently adult ♂ of *californicus* from San Diego County, Calif., taken Feb. 4, 1913, measuring 920 x 410 x 123 and weighing 7 lbs."

Colour. All above, bright, clear, coarse pepper-and-salt, with the warm buffy under-fur showing through. The ears, sides of head, and neck and legs, strongly tinged with deep brownish orange; the flanks, insides of legs, anal region, and under side of tail of the same colour but paler; a sort of Coon mask of dark brown runs from eye to nose. Ears inside, cheeks, throat, and all below, pure white, the sides of the muzzle, chin, mane on tail, black. *Tip of tail, black* always, whereas in the Red-fox group it is always white.

This description is founded on a fairly typical October ♂ from Hastings, N. Y.

An interesting variant is recorded by Bachman who had for many years a beautiful specimen of the Gray-fox "which was barred on the tail like the Raccoon, and had a dark cross on the back like that of *Canis crucigera* of Gesner."[4]

So far neither white ones (albinos) nor black ones (melanos) have been recorded.

The mane on the upper line of the tail is the chief outward anatomical distinction of the Gray-fox as compared with the Red-foxes; it is composed of rather coarse hair like that on the shoulders, but lacks the woolly under-fur.

This mane I discussed as follows in the *Journal of Mammalogy*, Aug., 1923, pp. 180–82.

Since it is not generally known that all of our Canidæ are more or less equipped with this over-emphasized mane, I have made studies to represent the chief groups of the family found in North America. I am glad here to thank the American Museum of Natural History for supplying me with the needed specimens and every facility for study.

The mane, it will be remembered, is composed of stiff hairs without any under-fur. It is well known that all of our Canidæ have a musk-

[4] Q. N. A., I, p. 163.

gland on the upper side of the tail near the base. The use of this is almost certainly for communication with others of his kind and is the personal label of the individual. It is his identification disc.

This gland is usually marked with a bunch of black-tipped hairs which spring from the area of skin which bears the gland, and are not mixed with under-fur. The absence of under-fur over the place where the sebaceous glands are so highly specialized is doubtless more than a mere coincidence.

No attempt was made to select these specimens except to get males and those fully labelled. The Gray-fox used had a mane and gland $4\frac{1}{2}$ inches long; but the next Gray-fox, also a male, had but 3 inches of mane and gland. So like all specialties it is highly variant. The peculiar shapes shown are individual; that labelled "Red-fox" seems to be the general type. A plan of each gland is given directly under the tail it belongs to, and on the same scale. In the upper part of the Plate is a life-size plan of each gland.

Tails Shown on Plate CXV

A, *Vulpes fulva* ♂, Fort Montgomery, N. Y. Am. Mus., 16672. Tail, $14\frac{1}{2}$ in. long; gland and mane, 1 in.

B, *Alopex ungava* ♂, Cape Fullerton, Hudson Bay. Am. Mus., 19481. Tail, 11 in.; gland and mane, $1\frac{3}{8}$ in.

C, *Canis latrans* ♂, Maple Creek, Sask. Am. Mus., 28270. Tail, $12\frac{1}{2}$ in.; gland and mane, $1\frac{1}{2}$ in.

D, *Canis occidentalis* ♂, Neutral strip, Oklahoma. Am. Mus., 6781. Tail, 14 in.; gland and mane, $1\frac{1}{2}$ in. In another specimen it was 1 in. wide and 3 in. long.

E, *Vulpes velox* ♂, Calgary, Alta. Am. Mus., 15871. Tail, $11\frac{1}{4}$ in.; gland and mane, $2\frac{7}{8}$ in.

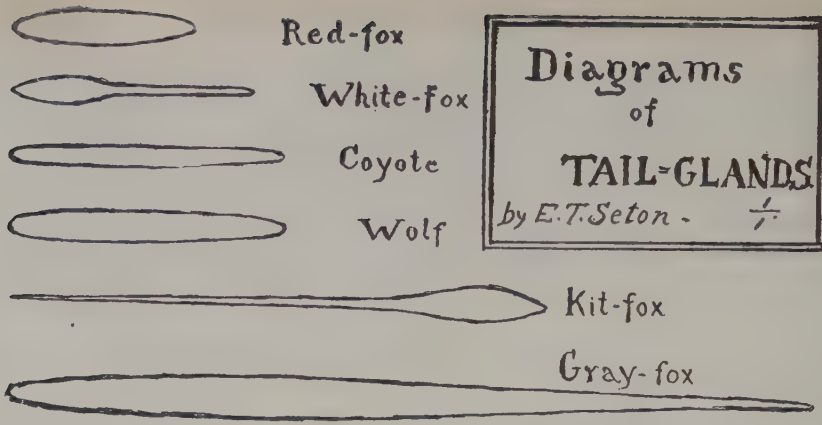
F, *Urocyon cinereoargenteus* ♂, Hastings, N. Y. Am. Mus., 3825. Tail, $14\frac{1}{2}$ in.; gland and mane, $4\frac{1}{2}$ in.

Races

The following forms of Gray-fox have been recognized:

cinereoargenteus Schreber, the typical form. T. l., Eastern North America.

borealis Merriam, like the type, "but decidedly larger, with marked tooth and skull differences." As large as a Red-fox. T. l., Marlboro, N. H.



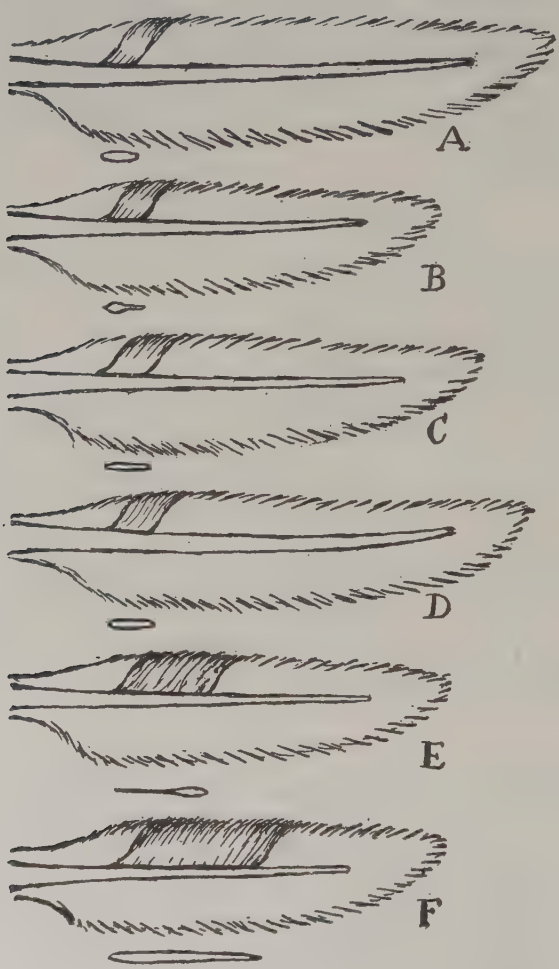


PLATE CXV—TAIL-GLANDS OF CANIDÆ

floridanus Rhoads, smaller than the type; hind-foot, tail, and ears shorter; pelage, shorter, harsher, and paler; the white of the under part is yellowish. A faded-looking creature found as far west as Big Thicket, Tex. T. l., Tarpon Springs, Fla.

ocythous Bangs, like the type, but paler, with longer ears and tail, and thinner muzzle. T. l., Platteville, Wis.

californicus Mearns, much like *cinereoargenteus*, but smaller and paler with larger ears and relatively longer tail. T. l., San Jacinto Mountains, Calif.

sequoiensis Dixon, like *californicus*, but larger and with fulvous areas much more intense in colour and more extensive. T. l., Lagunitas, Calif.

townsendi Merriam, like *californicus*, but much larger, with ears decidedly smaller; in colour, intermediate between the two foregoing. T. l., Baird, Shasta County, Calif.

scottii Mearns, like *cinereoargenteus*, but more slender with longer ears and tail, and paler colours. T. l., Penal County, Arizona.

guatemalæ Miller, a very small pale race. T. l., Nenton, Guatemala.

fraterculus Elliott, a small dark race. T. .., San Felipe, Yucatan.

parvidens Miller, like *fraterculus*, but with smaller teeth and shorter tail. T. l., Merida, Yucatan.

inyoensis Elliott and *texensis* Mearns, are not considered valid races.

The Santa Barbara Islands, off the coast of California, are credited with a surprising array of pygmy Mane-tails. These have been long enough marooned to beget each some local and insular peculiarities.

They are so much smaller than those of the mainland that any one can distinguish the islanders at sight, but when it comes to separating one island form from another, it is a different and purely technical matter. Sportsmen will find it best to name each after the island where it was taken, and leave to scientists the discussion of their minute differences.

The following have been listed:

littoralis Baird, a dwarf, otherwise like *californicus*. T. l., San Miguel Island.

littoralis santacruzæ Merriam, similar to the foregoing, but of brighter colours and with slenderer skull. T. l., Santa Cruz Island.

clementæ Merriam, like *littoralis*, but skull smaller, nasals more

tapering behind, muzzle more slender. T. l., Santa Clemente Island.

catalinæ Merriam, like *littoralis*, but tail longer, nasals narrower and not constricted in the middle, muzzle longer. T. l., Catalina Island.

Mexico is within the range of the Gray-fox, forms having been described from Yucatan and Guatemala, as well as Colombia; but little is known of their range or affinities.

As one compares the above races, the sandy paleness of the Arizona form, the silvery brightness of the Californian, and the pygmy proportions of the islanders are very striking indeed, but the creatures show the same pattern, the same general colour scheme; and, obviously, all are the same animal just as surely as they manifest the same habits from New Hampshire to Florida, and from Virginia away west to the islands of the sea.

Range

The Gray-fox is a perfect respecter of the altitudes and the zone-laws laid down by our Biological Survey. Indeed, he is a model in this matter. As soon as—yes, sooner than—a faunal area is mapped, he accepts it and sets to work to develop a race that will fit. His adherence to the Carolinian in the East and the lower Sonoran in the West is modified chiefly by the presence or absence of forests, though in California, Dickey writes me, the species is found up to high Transition in the mountains.

Like the Gray-squirrel, the Gray-fox is perfectly able to take care of himself, provided we do not rob him of his mother woods. This, however, we are doing fast. Nevertheless, he still maintains the unequal fight; in some regions, he is even spreading his range a little wider.

The following notes are evidence of the Gray-fox scouting parties reaching new, far, possible woods.

In 1897, Rhoads writes that, though rare in the northern parts of Pennsylvania, the Gray-fox now visits every township in the State. This could not have been said 20 years before.[5]

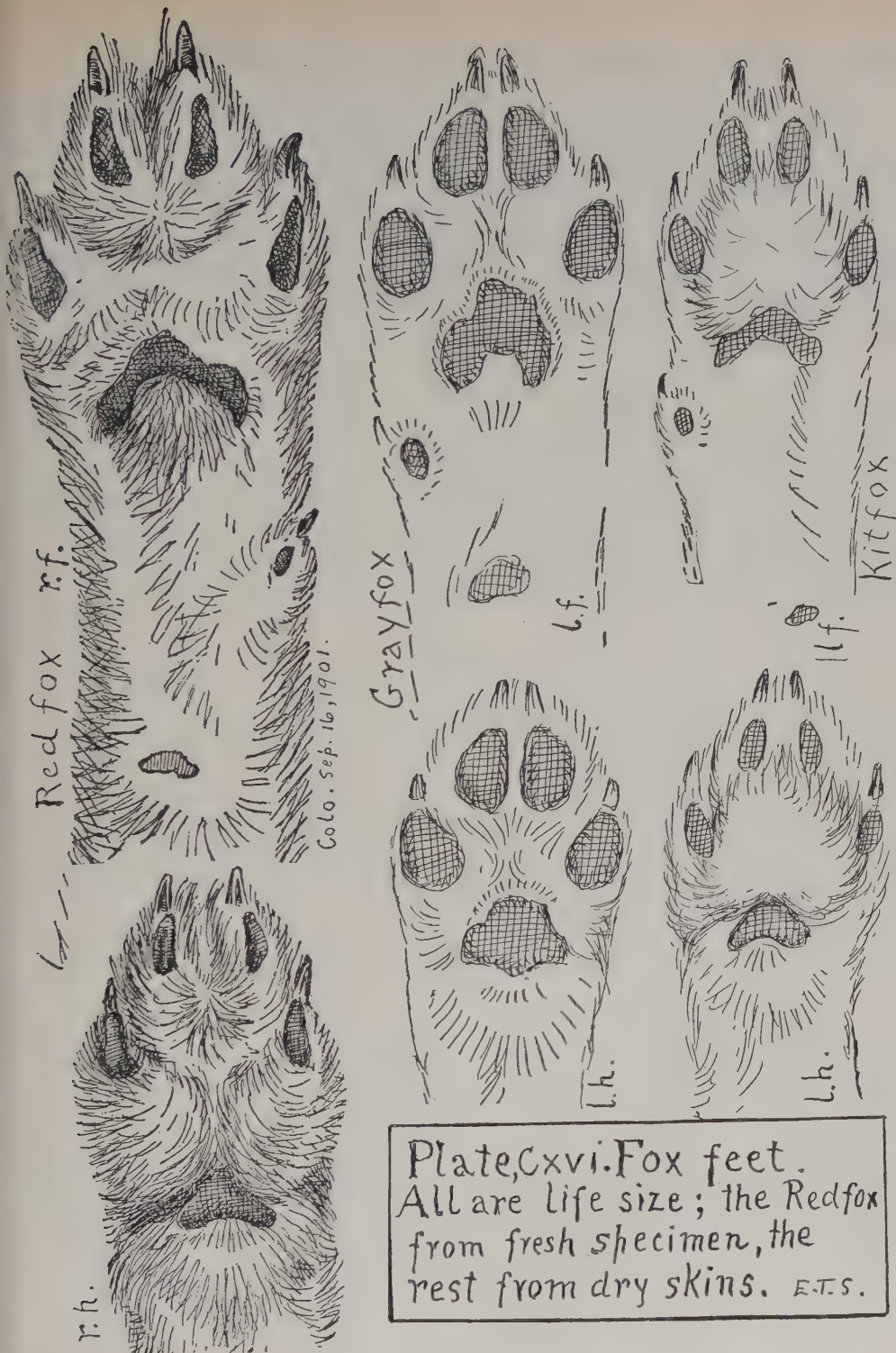
In Michigan, according to Norman A. Wood, it has been recorded from nearly all parts of the Lower Peninsula and from Gogebic and Delta counties in the Upper Peninsula which is beyond its proper map.[6]

J. E. Marshall reported in 1911 that the Gray-fox was rare in the region, but that he had trapped 2 near Gogebic Lake.[7]

[5] Mamm. Cent. Penn., p. 220.

[6] Mich. Mamm., April 1, 1914, Univ. Mich., p. 9.

[7] Dice & Sherman: Mamm. Gogebic, Mus. Zoöl., Univ. Mich., Feb. 25, 1922, p. 27.



Plate, Cxvi. Fox feet.
All are life size; the Red fox from fresh specimen, the rest from dry skins. E.T.S.

On the other hand, there is some evidence that its northward range has shrunken. In the *Canadian Field Naturalist* for Jan., 1921 (pp. 19–20), is an article by W. J. Wintemberg, announcing the find at Uren Village Site, South Norwich Township, Oxford County, Ont., of several lower jaws and part of a skull of Gray-fox (*Urocyon*) identified by Dr. G. S. Miller of U. S. Nat. Mus. The species seems to have been as common there as the Red-fox. P. A. Taverner of the Ottawa Museum tells me that a specimen was recently taken at Point Pelee, Lake Ontario.

Haunts

In spite of some contradictory testimony, the Gray-fox seems to be more truly a forest animal than the Red-fox. It is notorious that Red-foxes always increase with partial settlement, but the Gray-fox is at home only in the unbroken forest or in the roughest of rock and brush land. As will be seen, he is adapted for that, rather than for the larger food possibilities and larger perils of a farming section.

Numbers

Bachman says that one quarter only of the Foxes taken in New York State in his time were Gray-foxes.[8] That, however, is near the north limit of the species.

In Pennsylvania, according to the Report of the Game Commission, bounties were paid on 29,873 Gray-foxes killed in the State between April 15, 1915, and Dec. 31, 1922; whereas only 24,922 Red-foxes were reported during that time.[9] In Ventura County, Calif., Dickey found recently a "superabundance of Gray-foxes."

Voice

The voice of the Gray-fox is said to be much like that of his Red cousin, but coarser, and in some of its notes even like that of the Coyote. But it has been little observed, and my own opportunities to hear it have been small.

No one has written of its soft whisperings to its young, or of its love-song. No one, so far, has thought of these as possible or worth while. But they surely have such, and the new generation of naturalists with better light and kindlier outlook, will seek for and find them.

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[8] Q. N. A., I, p. 51.

[9] Seth E. Gordon: Bull. Am. Game Prot. Assn.

Disposition

If we mix equal parts of Red-fox, Coon, and Bobcat, and season the combination with a strong dash of Cottontail Rabbit, we shall have the Gray-fox's disposition synthetically produced. He is shy, he is cunning, he is a desperate fighter when at bay, he loves the trees and yet rejoices in the briar brush, he can run for hours and is an adept at trick-trailing, but will hide in a burrow or up a tree; and the places he frequents are the places where any one of these animals also may be found.

As I read the classic pages of Audubon and Bachman, I note that they say the Gray-fox is "shy and cowardly."[10] Reference to a long list of natural histories reveals the fact that every animal treated in this book is by someone described as "shy and cowardly." The truth is, I take it, that no animal is such. All animals are brave, for I do not know of one—with the possible exception of the Opossum—that will not fight to the death when brought to bay, no matter how numerous or powerful his foes may be. What is there of cowardice in a helpless Gray-fox of 10 pounds weight running away from 20 large hounds each 60 pounds, backed by half-a-dozen hunters each 150 pounds weight, on half-a-dozen horses each 1,500 pounds weight, and armed too often with guns and pistols into the bargain? Discretion is the better part of valour; the valiant Gray-fox is discreet. But do you want to see a fair fight and make a just appraisal of courage? Select a 10-pound Dog and match him against a 10-pound Fox. Then you will have no cause to charge the Fox with cowardice. Indeed you will have to play special Providence if you would save your Dog from destruction. Yes, go a step farther. You—a 150-pound man, we will suppose—go into the arena alone and armed only with nature's weapons, and grapple with a 10-pound Gray-fox—if you dare; and see which of you will come out free of the taint of cowardice.

Men there be, indeed, who lie down and give up when certain death is closing in on them. But the Gray-fox, according to the hunter, J. C. Bruce, when caught in a trap, never is cowed, never gives up, in spite of his helplessness, "but will growl, snap, and bark from the time he sees you till he is dispatched."[11] A brave man loves a brave foe, they say. Our reaction to the dauntless fortitude of the brave Gray-fox then sheds a shameful light, a dastard colour on our own kind, if we believe the evidence given in the last chapter of this record.

Some day I shall write a history of man as seen by the animals. They

[10] Q. N. A., I, p. 164.

[11] Cal. F. & G., July, 1921, p. 182.

may justly say: He is the most stupid and cowardly of all creatures. Although equipped with powers that are overwhelming, and with every advantage of size and assistance, he never is known to accept an equal fight, and at the slightest suggestion of danger, will fly back screaming with terror to hide in his den. Indeed, it is an axiom among us animals that the smallest of us need not fear the biggest of them, unless he be backed and protected by huge Dogs—renegades from our side—and has us hopelessly overmatched and outnumbered."

The Gray-fox is less swift, less strong, and less cunning than his cousin, the Red-fox. The one is a bandit, the other a burglar. But both know that they play a desperate game. They carry their lives in their teeth, and neither give nor expect quarter when the final show-down comes.

Every scrap of evidence goes to show that, whatever we think of the Gray-fox as an economic problem, as a menace to our material agricultural interests, he is at least endowed with the attributes that an impartial judge would say "make a hero."

Marriage Customs

And what is the home-life of our hero? We should like to find it ideal, and, even if it were utterly regrettable, we should have to make excuses and allowances, as we do for weak-moralled human heroes. So far as known, the Gray-fox is a model husband and father; that is the tradition of his family; Wolves and Foxes are most exemplary. Alas, we have been so busy hounding the Gray-fox to his death, that we have never paused to ask what are his answers to the great questions of sex and duty that still torment ourselves.

Among all the masses of written stuff in which the Gray-fox is flayed dead and alive, physically and metaphorically, I can find only three brief paragraphs that shed light—pleasing light—on this little bandit of the black woods, and his life at home. The first is from the pen of good old John Bachman, who says: "On a cold starlight night in winter, we have frequently heard the hoarse querulous bark of this species; sometimes two of them some distance apart were answering each other in the manner of the Dog."[12] Why chiefly on cold winter nights? I do not know, except that analogy of the Red-fox and evidence furnished by Donald R. Dickey show that this is the love time.

The second is by Harry H. Dunn. He was Coyote-hunting in Death Valley, Calif., with a half-breed, Bob Lee, who was an expert at "calling." They had called two Coyotes and killed them with bow-and-arrow, when

[12] Q. N. A., I, p. 166.

it occurred to the hunters to try the trick on the Gray-fox which is common there.

"Just before we went home, the half-breed changed his call, and out of the hills came, not one, but three answers, all short, sharp barks. The weird dialogue continued for a few minutes, and then out of the darker shadows across the wash came two little Gray-foxes. Both stood in plain sight, possibly 25 yards away.

"'Shoot! Quick!' said Bob. I raised the rifle just as one of the Foxes wheeled, and at the crack the vixen pitched forward. Before I could shoot again, her mate disappeared.

"I remarked on the fact of the pair travelling, and apparently hunting, together, and Bob said it was common occurrence in his hunting experience to find them so in all seasons of the year, except when the young were in the 'form.'"[13]

Another glimpse of the partner life of the Gray-fox and his bride is maybe furnished by the following note from my Journal:

While staying at Kinney's Ranch, Tucson, Ariz., Jan. 23, 1923, I noted a remarkable incident that looked like a clever stratagem on the part of the Gray-fox. About 6 A.M., gray dawn, *something* led all the Dogs away to a distance on the north side of the ranch. Then around the chicken-yard on the south side arose the unmistakable harsh squall of a Gray-fox, going round and around the chicken-yard for a minute or more. I suppose that one of the pair led off the Dogs, while the other was to raid the hen-yard, but the tall fence frustrated the plan. Why should the Fox squall there so long and so loud?

The last, in a letter from my friend, Donald R. Dickey, gives something more than a hint of ideal family life. He says:

"My own experience tends to convince me that the pair stays together at least until the cubs are well grown, for I am myself satisfied that a series of a dozen or more photographs taken at one den portrays 2 adults. There were at least 3 cubs in this litter (subspecies *californicus*—3 cubs in one photo.)"

Young naturalists of the new epoch, will you not keep these things in mind and look for them? The fact that this freebooter of the tall timber is a true and loving husband and father, with a home-life and social pleasures, and a song expression of his own; and every scrap of evidence that you can gather to prove these things is fine gold—is a new fragment of the priceless mosaic that every field-man is striving to piece together—a mosaic that is the dream of every wise one, more beautiful and amazing than any of our fanciful dreams of it can be, for it will be the truth.

[13] Forest & Stream, Aug. 3, 1907, p. 172.

Plate, Cxvii. Tracks of Four Foxes; all are life size; in winter all pads are obscured with bristly hair. The trail series at the bottom will do for any of them, they differ chiefly in size. E.T.S.

In January, the Snow Moon, the Gray-fox wins his bride. Yea, though they have been mated for years, she must then be won over again.

For about 3 months, according to Bachman, the female hides her secret;[14] the analogy of the Red kinsman, however, would make it much less, more nearly 50 or 60 days. And then, absolutely obedient to the All-mother's whispered word, she selects a nursery for the coming brood.

The Den

Not in a burrow underground, as with the Red-fox, is the nest prepared. A hollow log, or a hollow tree, is the favourite home den of the woodland mother Fox. Once, however, Bachman discovered it under the roots of a tree.[15] In the West, it chiefly dens in holes under rock piles.

"The two whelping dens I located in the West," says Dickey, "have both been under piles of large, loose rocks. One of them had three exits. In northern California, a refuge den found in the winter, by running an animal into it, was a hole in the ground under a large fallen tree, but may have originally been excavated by some other animal."

Although in general the Gray-fox neither digs nor uses a burrow, Bachman records one instance to the contrary. On a high, sandy pine-ridge west of Albany, N. Y., he found a "burrow from which a female Gray-fox and 4 young were taken. It differed widely from the burrows of the Red-fox, having only a single entrance. At about 8 feet from the mouth of the burrow there was an excavation containing a nest composed of leaves"; in this they found the young.[16]

Young and Age

Here during mid-March in Dixieland, and mid-April in Yankeeland, the mother Gray-fox drinks the double goblet of motherhood—the joy of their coming, the fear for their safety.

Three to five young there are in the litter, and so far as we know, the father hangs about the neighbourhood, leaving little offerings at the door; but he takes no part in hovering or feeding the young until at length they begin to eat solid food, when about 6 weeks old.

Then he is permitted to become again a member of the family and provide maybe half of the food that is needed. In August or September the young are weaned, and very soon now the family bond is broken. The cubs

[14] Q. N. A., I, p. 171.

[15] As above, p. 167.

[16] As above.

go off alone to seek their fortune, and father and mother resume their roving life in partnership.

The young are quite independent of the mother now, and it is believed, but not made sure, that in December, though but 9 months old, they take each a mate unto himself.

"It is said they continue to grow for 18 months, and will live in freedom 14 or 15 years, but pine away and die in a much shorter period if in a state of confinement."[17]

Winter Dens

The Gray-fox seems to differ wholly from the Red-fox in his habit of establishing a series of winter dens. The Red-fox, I think, never goes into a den except when it is used as a nursery for the young or as a refuge in extremity. Even in zero weather the Red-fox sleeps out. But the Gray-fox seems to have a definite system of holes that are his hunting lodges, his bad-weather homes in various parts of his range, all through the winter, and which also serve as final refuges in case the hounds are over-near.

Natural caves and rocky fissures are most often selected, but there is evidence that Grayback sometimes digs them for himself in sandy or clayey soil. In the wild and rocky woods on the Jersey side of the Hudson River are numbers of these rocky refuges, which serve either as permanent dwelling places or safe resorts in case of hard pursuit. "In this neighbourhood," says Bachman (p. 168), "they are most easily killed by finding the paths to their hole, and after starting the animal, making the best of your way to near the entrance of it, while he doubles about a little before the Dogs; you can thus generally secure a shot at him as he approaches his home, which if the Dogs are near he will do without looking to see if he be watched." Yes, this has often been done. But in other walks of life it is called assassination.

"In the State of New York," continues this genial old sporting naturalist, "we were shown a hollow tree leaning on another at an angle of about 45 degrees, from a large hole in which 2 Gray-foxes had been taken; they were traced to this retreat by their footsteps in the deep snow, and from the appearance of the nest, it seemed to have been their resort for a long time."[18]

His Answer to the Dogs

In most rustic minds, the word "Fox" conjures up at once its kin word "hunting." When pursued by the hounds, the Gray-fox, like the Red, may strive to tire them out by a long run, or throw them off the scent, or finally

[17] Doughty's Cabinet of Natural History, 1890, II, p. 145.

[18] Q. N. A., I, p. 167.

hide in a hole underground. But he has a much better trick than the last. There is a well-known ancient fable that a Fox and a Cat were swopping notes on their problems, and especially on how to baffle the hounds. The Fox said, "Pooh! I never fear the hounds. I have a bag full of tricks to play whenever I hear them after me." The Cat looked his admiration but said, "Alas, I have only one trick and that is to climb a tree, but I have always found it quite satisfactory." The Fox replied that he never tried that and didn't need it. Eventually, however, he lost his life for lack of it.

That fable might apply in Europe, but not here, for our Gray-fox climbs a tree almost as well as a Cat.

Climbing

Bachman says: "Although we have often seen this Fox fairly run down and killed by hounds, without his having attempted to climb a tree, yet it not unfrequently occurs that when his strength begins to fail, he ascends one that is small or sloping, and standing on some horizontal branch 20 or 30 feet from the ground, looks down on the fierce and clamorous pack which soon comes up and surrounds the foot of the tree.

"We were on one occasion, in company with a friend, seeking for partridges in an old field partially overgrown with high grass and bushes, when his large and active pointer Dog suddenly started a Gray-fox, which instantly took to its heels, pursued by the Dog; after a race of a minute, the latter was so close upon the Fox that it ascended a small tree, and our friend soon came up and shot it. We were unable to obtain any information in regard to the manner in which the Fox climbs trees, as he does not possess the retractile nails of the Cat, or the sharp claws of the Squirrel, until we saw the animal in the act. At one time when we thus observed the Fox, he first leaped on to a low branch, 4 or 5 feet from the ground, from whence he made his way upward by leaping cautiously and rather awkwardly from branch to branch, till he attained a secure position in the largest fork of the tree, where he stopped.

"On another occasion, he ascended in the manner of the Bear, but with far greater celerity, by clasping the stem of a small pine. We have since been informed that the Fox also climbs trees occasionally by the aid of his claws, in the manner of a Raccoon or a Cat. During the winter only about one fifth of the Foxes chased by hounds will take a tree before they suffer themselves to be run down; but in summer, either from the warmth of the weather causing them to be soon fatigued, or from the greater number being young animals, they seldom continue on foot beyond 30 or 40 minutes before they fly for protection to a tree. It may here be observed that as long

as the Fox can wind through the thick underbrush, he will seldom resort to a tree—a retreat to which he is forced by open woods and a hard chase."[19]

"In climbing," says Rhoads, "it shows a strange affinity to the Cats, not only leaping from limb to limb in pursuit of prey, but ascending quite tall and limbless trunks, by a regular clawing and hugging process, literally 'shinning it'!"[20]

Later, this naturalist says that Seth Nelson, Jr., the son of a well-known woodsman, "told me he had seen one ascend after a Squirrel to the height of 60 feet, on an erect dead pine stripped of its bark. It did this voluntarily, literally 'shinning' 25 feet up the branchless trunk and backing down again, as a boy would do it. He has known his Dogs to run them up an erect tree 18 inches in diameter, the first limb of which was 20 feet from the ground."[21]

"They have been surprised in the top of a tree, curled up in the abandoned nest of a hawk."[22]

In Texas the same habit is recorded.

"These Foxes go up the trunk of a tree with almost cat-like ease," says Bailey. "I have found them looking down at the Dogs from 20 to 40 feet up in the brances of nut-pines and live-oaks, and have known of their climbing a yellow pine (*Pinus ponderosa*) where 20 feet of straight trunk over a foot in diameter intervened between the ground and the first branch. More often they take to a live-oak or juniper, where the lower branches can be reached at a bound, and then, squirrel-like, hide in the swaying topmost branches. On the approach of the hunter, they become anxious and seem to doubt the security of their position, sometimes making a flying leap to the ground. Stones and clubs will usually dislodge them from the treetop.[23]

Even in the Far West, where the greatest variation from the type is seen, the Gray-fox is the Tree-fox.

Robert P. Lincoln writes: "The Foxes (of California) are either trapped or run at night with a swift Dog, as a swift Dog will tree them the same as a Coon, but they will leave a slow Dog and lose him in the rocks, streams, and steep mountains. The idea of treeing a Fox will be laughed at, but our Gray-foxes tree readily enough here, and the same is true through the South. Though not so good at climbing as a Coon, I have shot them 40 feet from the ground on an almost perpendicular tree."[24]

[19] Q. N. A., I, p. 166–67.

[20] Mamm. Penn. & N. J., pp. 143–44.

[21] Mamm. Cent. Penn., p. 220.

[22] Mamm. Penn. & N. J., p. 144.

[23] Texas, p. 181.

[24] Forest & Stream, Dec. 19, 1914, p. 787.

Food

There is not the least doubt that the Gray-fox is as omnivorous as anything alive. He will eat almost everything that any animal will eat, but his preference is for flesh. Here are some of the staples of his bill of fare: Fawns, young Woodchucks, Possums, Rabbits, Skunks, young Pigs, young lambs, Muskrats, Porcupines, Weasels, Squirrels of any kind, tree or ground, Rats, Mice, Moles, all kinds of birds it can catch, including poultry, all kinds of eggs that it can find, including those of turtles and snakes, young turtles, snakes, lizards, frogs, fish, shrimps, clams, oysters, crayfish, grasshoppers, maggots, fruits, berries, corn, nuts, acorns, and mushrooms.

An ancient Japanese philosopher it was who said, "Show me what he eats and I'll tell you what he is." This same leader of celestial thought might have been profoundly puzzled had he been called on to analyze the mind of the Gray-fox on the strength of his diet as herein set forth.

In Texas, during "June, they were feeding extensively on berries of *Zizyphus obtusifolia* and *Adelia angustifolia* along the Rio Grande near Boquillas, while around the Davis Mountains in early August they were feeding mainly on the ripe fruit of *Opuntia engelmanni*. In December in the Davis Mountains and in September in the Guadalupe Mountains they were eating the sweet pulpy berries of *Juniperus pachyphlœa*, which grow in great abundance in these ranges and in the Chisos Mountains. Mice, Wood Rats, Ground-squirrels, Rabbits, and various other small rodents are eaten when obtainable, and, much to our annoyance, are often taken from our traps or carried away, trap and all. At Langtry, Gaut examined several stomachs, and in one found part of a mocking-bird and in another a *Perognathus*. At most of the ranches there are enough Dogs to keep the Foxes at a respectful distance from the poultry; but they have a keen relish for chickens, and are often complained of in vigorous terms. Without data for positive statements it seems probable that the good done in destroying small rodents equals, if it does not exceed, the mischief done among poultry."[25]

Note, however, that all of these foods are the produce of the forest. Even the Pigs and poultry must stray into the woods before they are in danger.

Bachman supplies this enlightening note showing that a new condition has developed a new habit.

[25] Texas, p. 181.

"A farmer of the State of New York called our attention to a field of corn (maize), which had sustained no inconsiderable injury from some unknown animals that had been feeding on the unripe ears. The tracks on the field convinced us that the depredation had been committed by Foxes, which was found to be the case, and they were afterward chased several successive mornings, and 3 of them, apparently a brood of the previous spring, were captured."[26]

Good old Bachman, though he made the unwarranted slip of calling the Gray-fox "a coward," has not failed to do justice to the huntercraft of the creature, for whom indeed he had evidently a sort of sneaking affection.

He says, "We have never, indeed, heard any well-authenticated account of the species having entered the poultry-yard of the farmer; it is true, it will seize on a goose, or a turkey hen, that happens to stray into the woods or fields and make its nest at some distance from the house; but we have not heard of its having attempted to kill Pigs, or like the Red-fox, visited the Sheep pasture in spring, and laid a contribution, from day to day, on the young lambs of the flock."[27]

In the mountains of Ventura County, Calif., where Dickey found a "superabundance" of Gray-foxes, "they seemed," he says, "to be feeding exclusively on manzanita berries. Here in the West, my own temptation is to minimize the actual damage done to poultry. The den that I studied longest was within 200 yards of a chicken run, and the birds used to wander through the brush patch where the den was located, except at night when they were penned up; yet only one chicken was brought to the den in all the time I watched it, and that was an old black hen that had been *long* dead when it was lugged to the den. In the Colorado River Valley, in the late spring (May 17th, to be exact), I observed one instance of a Gray-fox that had been evidently hunting through the low willow bottoms during the night, and was carrying back, presumably to its young, two small Rabbits (*Sylvilagus audubonii arizonæ*) and one juvenal Abert towhee (*Pipilo aberti*)."[28]

Rhoads, after a full investigation of the species in Pennsylvania, felt compelled to write:[29]

"The food of both species of Eastern Fox forms an important consideration in their relations to man. The concurrent opinion of nine tenths of the farmers and sportsmen of Pennsylvania who contributed to Dr. H. B. Warren's economic report on these animals, heartily condemns both species as

[26] Q. N. A., I, p. 166.

[27] As above, I, p. 164.

[28] Letter, Oct. 4, 1923.

[29] Mamm. Penn. & N. J., p. 144.

vermin in the worst sense With this opinion I fully concur. The only argument brought up in their favour is their destruction of Mice, Moles, and insects. As I have previously pointed out in treating the *Muridæ*, and as I shall explain later in regard to the *Insectivora*, the destruction of Mice and Moles is not necessarily a benefit to man, the majority of the former not being proved to be noxious, especially the woodland species which Foxes principally devour. Owing to its subterranean habits, the Pine-mouse, a truly noxious rodent, is rarely captured, the Wood-vole (*Evotomys*), Meadow vole (*Microtus*), and Deermouse (*Peromyscus*) being the species forming the bulk of their Mouse diet. Their destruction of insects, especially grasshoppers, is no doubt beneficial, but seems to be only fortuitous, one turkey or chicken probably eating as many of these in a day as all the Foxes of a square mile in the same length of time. When the Fox comes along, as he is ever doing, and eats the turkey, methinks his value as an insect-destroyer suddenly vanishes."

Such opinions have weight, of course, but are far from conclusive. They are merely opinions, founded partly on evidence and partly on prejudice. And they ignore altogether the æsthetic value of the Gray-fox, and the need for maintaining the balance of nature as we found it. For my part, I would suffer much damage before I would plot to rid our woods of this delightful little rascal. And if our friends who feel not so will fairly appraise the annual damage by Dogs, and then tell me that in fairness and logic, all Dogs should be destroyed, they will at least be facing facts, and realize that sentiment is the biggest fact of them all.

Thus, O brave little Gray-fox, you are on trial—not for your life, but for your reputation, which in this case amounts to nearly the same thing, and I, being self-appointed judge and wholly prejudiced in your favour, do pronounce you "not guilty." Go! You are as free and as blameless as ever you were, and when you need a friend, you seek me out.

Though this case be closed, I would refer again to Bachman, who seems to have known the Gray-fox better than any writer since, and in quoting the damning evidence of Mane-tail's destructiveness, it is pleasant indeed to note the old naturalist's undertone of delight at the success of the grizzly-coated rogue.

"That this Fox occasionally gives chase to the Gray-rabbit, pursuing him in the manner of the Dog, we have strong reason to suspect. We on one occasion observed a half-grown Rabbit dashing by us with great rapidity and running as if under the influence of fear; an instant afterward a Fox followed, seeming to keep the object of his pursuit fairly in sight; scarcely had they entered the woods, when we heard the repeated cry of the Rabbit,

resembling somewhat the cry of a young child in pain, and although we were not eyewitnesses of his having captured it by sheer speed, we have no doubt of the fact. We do not believe, however, that the Fox is an enemy half as much to be dreaded by the family of Hares as either the Bay-lynx or the great horned owl (*Strix Virginianus*).

"In the Southern States, this species is able to supply itself with a great variety and abundance of food, and is consequently generally in good condition and often quite fat. We have followed the track of the Gray-fox in moist ground until it led us to the scattered remains of a Marsh-hare, which no doubt the Fox had killed; many nests of the fresh-water marsh hen (*Rallus elegans*) are torn to pieces and the eggs devoured by this prowler. In Pennsylvania and New Jersey, the Meadow-mouse (*Arvicola Pennsylvanica*) is often eaten by this species, and in the Southern States, the Cotton-rat and Florida Rat constitute no inconsiderable portion of its food. We have seen places where the Gray-fox had been scratching the decayed logs and the bark of trees in order to obtain insects."[30]

"The wild turkey hen often makes an excavation in which she deposits her eggs, at a considerable distance from the low grounds, or makes her nest on some elevated ridge, or under a pile of fallen logs covered over with scrub oaks, ferns, tall weeds and grasses; we have often seen traces of a violent struggle at such places; bunches of feathers scattered about, and broken egg-shells giving sufficient evidence that the Fox has been there, and that there will be one brood of wild turkeys less that season. Coveys of partridges, which generally at the dusk of the evening fly into some sheltered place and hide in the tall grass, arrange themselves for the night in a circle, with their tails touching each other and their heads turned outward; the Gray-fox, possessing a considerable power of scent, winds them like a pointer Dog, and often discovers where they are thus snugly nestled, and pounces on them, invariably carrying off at least one of the covey.

"On a cold, drizzly, sleety, rainy day, while travelling in Carolina, we observed a Gray-fox in a field of broom-grass, coursing against the wind, and hunting in the manner of the pointer Dog. We stopped to witness his manœuvres; suddenly he stood still, and squatted low on his haunches; a moment after, he proceeded on once more, but with slow and cautious steps; at times his nose was raised high in the air, moving about from side to side. At length he seemed to be sure of his game, and went straight forward, although very slowly, at times crawling on the earth; he was occasionally hidden by the grass, so that we could not see him very distinctly; however, at length we observed him make a dead halt. There was no twisting or

[30] Q. N. A., I, p. 166.

horizontal movement of the tail, like that made by the common House-cat when ready to make a spring, but his tail seemed resting on the side, whilst his ears were drawn back and his head raised only a few inches from the earth; he remained in this attitude nearly half a minute, and then made a sudden pounce upon his prey; at the same instant the whirring of the distracted covey was heard, as the affrighted birds took wing; two or three sharp screams succeeded, and the successful prowler immediately passed out of the field with an unfortunate partridge in his mouth, evidently with the intention of seeking a more retired spot to make a dainty meal.

"We had a gun with us, and he passed within long gun-shot of us. But why wound or destroy him? He has enabled us for the first time to bear witness that he is not only a Dog, but a good pointer in the bargain; he has obeyed an impulse of nature, and obtained a meal in the manner in which it was intended by the wise Creator that he should be supplied. He seized only a single bird, whilst man, who would wreak his vengeance on this poacher among the game, is not satisfied until he has killed half the covey with the murderous gun, or caught the whole brood in a trap, and wrung off their necks in triumph."[31]

Storage

So far as noted, the Gray-fox has not the habit of storing food for hard times ahead. This may mean that the southland which he inhabits has so little of snow and so much of game, that he is sure of a living the year round, or it may mean that we have been too busy hounding and killing him to notice his pleasant little ways.

Habits in General

Although the Gray-fox is chiefly nocturnal in his habits, Bachman "frequently observed him in search of food at all hours of the day; in general, however, he lies concealed in some thicket, or in a large tuft of tall broom-grass, till twilight invites him to renew his travels and adventures."[32]

"The Gray-fox is frequently caught in steel-traps, and seems to possess far less cunning than the Red species; we have never, however, seen it taken in box-traps, into which the Bay-lynx readily enters; and it is not often caught in dead-falls, which are very successful in capturing the Raccoon and Opossum.

"The Gray-fox does not possess the rank smell of the Red-fox or the European Fox; as a pet, however, we have not found him particularly in-

[31] Q. N. A., I, pp. 164–65.

[32] As above, I, p. 166.

teresting. It is difficult to subdue the snappish disposition of this species, and we have never seen one that was more than half tamed. It does not at any time become as playful as the Red-fox, and continually attempts to escape."[33]

His wild-wood cunning does not leave him in captivity, as the following incident shows. It was sent me by Geo. G. Byram of Succasunna, N. J.

"A Gray-fox and her 3 kits were kept chained in a farmyard here. After several months the poultry seemed to be disappearing, and a watch was kept and the circumstance explained. The Foxes would push their food away from their boxes so far that the chickens thought themselves out of danger, but when they were eating, a Fox would pounce on one and make a meal of it."

Diseases

As to the diseases and private troubles of the little Gray-fox, we have no information, and if he has special medicaments, such as herbs, tonics, salt-licks, or watering places, they have hitherto escaped observation.

Indeed, we have been so wholly intent on killing him that we know almost nothing of Gray-coat's mind when it is concerned with the other chapters of his life.

When Our Brave Ones Go Forth to Kill Him

We can get up quite a respectable surge of human emotion over the story of Eliza's dash across the ice to escape one or two bloodhounds and some human brutes who were planning to send her back to the home and condition that she preferred to abandon. Very good! Can we not conjure up some warmth and sympathetic thrill over the efforts to escape made by our valiant little Gray-coat when pursued by half a hundred hounds and a score of mounted riders absolutely bent on tearing him to pieces?

And what does he do when the hideous yelling, trampling, and roaring notify him that a host of strong foes have resolved on his death? Does he surrender? Throw himself on the mercy of the merciless? Not he! He is schooled in a school of valour. He has not the speed, the strength, or the cunning of his cousin, the Red-head, but he has a few tricks.

His first dash is for some thickly grown and tangled retreat, preferably a labyrinth of rocks and windfalls, or if in a dry country, the shelter and concealment of a heavy growth of young pines along some elevated sandy ridge where they grow to hedge-like closeness; having gained this, he threads the low down-trails and dashes through the densest thickets, where Dogs

[33] Q. N. A., I, p. 168.

can hardly follow him. He does not, like the Red-fox, run far ahead of the pack, but generally courses along from 70 to 100 yards in advance of his pursuers, continually doubling when in favourable ground, so that when the hunter is on foot, even, he can occasionally obtain a "view," and can hear the cry of the pack all the while.

In twenty minutes, usually, he has proved or disproved the value of that thicket. His pursuers are hot and close behind him. But he knows of other labyrinths even better perhaps than this, and now he plays a trick that is beyond the power of his Red cousins. He shins up the biggest tree he can get near! Up, up to its longest limb; along that he runs to its farthest branch, then leaps to the ground and away.

This makes a break in the scent that will keep the hounds some minutes in working out. Some minutes may mean a mile.

Meanwhile, he is speeding far away, and if so be that a snake fence crosses his path, he mounts the top rail and runs it like a Cat, for it is a good scent-breaker.

Thus he plans many delays for his following foes, and if the next haven be not too far, he makes it, and resumes his baffling tactics of winding, cat-climbing, zigzagging, back-tracking, and dashing away.

If seen in the open on a straight-away, the hounds may catch him in 200 or 300 yards; rarely indeed can the Gray-fox hold out for more than two hours in an open run. But an open run is not his game, and if the fates be not set on his destruction, he can usually reach another labyrinth and play his own cute strategy. If, at last, he is tiring out, and must in some sort say "good-bye," his ancient and long-time most effective trick is to climb some tree, and curled in a high fork or even in the nest of a crow or a hawk, make silent mockery of his baffled yelling foes below.

An old darkey who was eyewitness of just such a ruse, described it thus: "Dat Fox, she oughter be let lib', I declar'! I neber seed such a trick as dat!" he cried.

. . . . . .

"Dat ar Fox cum' cross dat field more'n a mile afore dem Dogs an' went ober dis yere fence right dar. He run down dar in de woods an' walked on dem logs an' on dat stump an' on to de tops ob dat tree what's out down dar. Den he cum back in de same track an' jumped up on dis fence right whar he went ober de fust time; he walked on de top rails tell he cum to dat big nest, den jumped right up into it. He is a-laying dar yit, jes' as scrumptious as you please!"[34]

This was a good trick when his people first learned it and taught it to

[34] W. A. Bruce: Recreation, Sept., 1901, p. 193.

their young. It was a perfect answer to pursuit by Wolves. But now the added peril of the huntsman is to be reckoned with—man, that can climb, or worse, can kill without climbing. The fugitive is commonly spied out in his high perch, compelled to leap—and tired and footsore runs again till the inevitable finish.

But even this is not heavy enough odds to cast against him. The unfairness and cruelty of the hunters (sportsmen!) is such that a common practice, according to Bailey, is to spy him out in his high perch, then have some rifleman break his leg with a shot, so that the brave Fox who leaps to dash again for life is a cripple, hopelessly overmatched. After a little run he is inevitably overtaken and torn to pieces by the fearless and valiant mob.[35]

There is, however, one Fox sanctuary—grim—invulnerable—inexorable—that never gives up its fugitive—that is, a den in the rocks. In all rocky country the Gray-fox aims to have at least one final refuge in the ledges, and once in that, he can mock at hunters, hounds, and guns. Like the Coney, the Goat, and the Woodchuck, his refuge, his hiding place and his salvation, is in the rocks. Maybe it is for this reason that his kind is increasing in New England. Nevertheless, he is also holding his own in other places, for his pelt is of little value; it costs large money to keep up a pack of hounds; he is learning new tricks as new tricks are brought against him, and in Dixieland, Texas, and California he is still abundant and likely to be. Long may he live and prosper.

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[35] Texas, p. 181.

SONG OF THE HUNTED

By Dr. Frederick Brush, of New York

(*By permission*)

Awake, awake, and the sun-kiss take!
Open the cave-dulled eye,
Sport freely in the open,
Let out the wild woods cry.
He came to snare,
He came to kill,
He of the iron arm and will;
But under the cliff he lieth still,
And no one saw him die.

Leap! breast and cleave the frosty air!
Beat the blue lakes to foam.
Tell all the young in nest and lair
The highland yet is home.
He came to kill,
He came to snare,
But the Gray-fox found him lying there,
And all dark red was his matted hair—
Roam, ye of the forest, roam.

Then awake, awake, and the sun-kiss take!
We have turned the evil thing.
No beast shall drag the red leg home,
No bird the broken wing.
He came to maim,
He came to kill,
He of the iron arm and will;
But under the cliff he lieth still,
And no one saw him die.

FOX-FARMING FOR FUR

By E. T. Seton, published in "Country Life in America," Jan., 1906

The rapid disappearance of certain wild fur-bearers, combined with the steady demand and ever-rising prices commanded by good furs, has led many to look for means of artificially supplying the want.

It is years since the idea of breeding for fur was first discussed, but never were the times so ripe as now, and it is the object of this article to set forth the important branches of the new industry for the benefit of those who wish to embark in it.

This kind of farming offers two distinct fields. First: the production of a new variety of some already domesticated and easily multiplied animal —as Cat, Dog, Goat, Rabbit, or cow—with a coat of such quality as to have a new value as fur.

The second: the breeding, under protection, of certain wild animals whose fur has already an established market value. In this class are Beaver, Mink, Otter, Skunk, Marten, Fisher, and Fox.

In other words, one makes a fur-bearer of an animal already domestic; the other makes domestic an animal already a fur-bearer.

The second is the only department that will be treated herein. There are two ways of dealing with this; we may call them the wholesale and the retail.

The first is the instinctive choice of the beginner. He usually plans to get possession of an island, a mountain valley, or at least a couple of hundred acres of wild land with a high fence around it. This he expects to stock with fur-bearers that will increase speedily to thousands, after which he has nothing to do but shovel in a few tons of offal weekly and draw off a few thousand of the choicest pelts yearly. This is what I call the wholesale method. It has never yet succeeded with Red-foxes, nor indeed with any creature that I know of, except, perhaps, to some extent, the Blue-fox on the islands of Alaska.

Success in breeding any domestic animal turns on personal care that can be directed and adapted to each individual, if need be; which is, obliquely, a reason why the would-be fur-farmer is better off with five acres than with five hundred. This individual method is what I call the retail plan; it has been proved a success many times.

Fur-farming is a good chance for small capital. A man of experience may put in $1,000 and get a remarkable percentage as soon as well started. But any one who thinks he can put in $10,000 or $20,000 and do the same with little experience and labour is certainly going to end in disaster.

There is no object in breeding cheap furs. A Muskrat with its fifteen-cent pelt is almost as much trouble to raise as a $300 Silver Fox; therefore, only the high-class fur should be considered.

What is the most valuable fur of all? No doubt the Sea-otter. But the animal is so rare that a large fortune would be exhausted in getting the stock, and nothing is known of the method necessary to its propagation.

Next on the list is the Silver Fox. The Black or Silver Fox is nothing but a black phase or freak of the common Fox, just as the black Sheep is a colour freak of the common Sheep. A pair of pure Red-foxes may have a black Fox in their litter, and that black Fox may grow up to be the parent of nothing but Red-foxes, but a Red-fox will bring only a dollar or two, and the Silver Fox a hundred times as much.

The thoughts of the fur-farmer, then, are likely to turn at once to the Silver Fox. The first objection usually made to it is its sterility in captivity. At one time, indeed, it was said that the Fox never breeds in confinement. This, however, is far from the truth. Experience proves that the Fox is as fertile in captivity as any other carnivore when properly managed. Another popular error that is widespread, even in books of good repute, is the idea that a Fox cannot be tamed. It is highly probable that some individuals will always continue wild and treacherous in captivity, but most of them respond to judicious treatment, and some of them, as I have seen, become as tame as House-cats.

The original pioneer of Fox-ranching was Charles Dalton, a trapper and fur-trader of Tignish, Prince Edward Island. In 1887, he began to experiment with Red-foxes. About the same time, Robert Oulton got some Silver Foxes to try out on his fur ranch. They gradually solved the problems and made fox-ranching a success. Since then, it has had a great boom (1910) and now again settled down to a reasonable basis as a sound and recognized industry.

It is not my purpose here to give full instructions in ranching, but I repeat my own paper of 1906, which, so far as I know, was the earliest published information on the subject. Those who wish to go into it as a business will find a list of guides and books of information at the end of this chapter.

I first saw Foxes successfully managed by N. E. Skinner, of Bangor, Me. He began a fur-farm in Winnipeg in 1899. But the best working out of fox-

farming as a paying commercial enterprise that I have seen, is at Dover, Me., where I had the privilege of inspecting the farms of E. Norton and M. F. Stevens, in July, 1905.

Stevens's enclosures were 30 feet each way and surrounded by a mesh-wire fence 10 feet high with an 18 inch overhang at the top, and sunk 3 feet into the ground. Six feet would have been high enough, but at Dover they have to reckon on snowdrifts 4 feet high. The overhang is necessary, as the Foxes climb up the wires like Cats. It is quite a common thing to see one or more of them clinging to the cage at a height of 10 feet from the ground, and there they stay for minutes at a time trying to get out by forcing the wires.

The Norton yards at Dover are considerably larger than the Stevens, his smallest being 50 by 25 feet, and the large runs 230 by 64 feet. The fences are alike.

After inspecting these two farms, and hearing of the various problems to be met, I should thus plan a small fox-yard—and no wise man will go into a large one until after he has had enough experience to avoid the inevitable blunders that on a large scale would be fatal.

The whole space is 120 by 230 feet, a little over half an acre. All the fences should be 10 feet high, of $1\frac{1}{2}$ inch mesh, No. 16 galvanized wire, as a kit—that is, a weanling in his first summer—can go through a 3-inch mesh, and a full-grown Fox can squeeze out of a 4 by 4. The netting should go 3 feet below ground, or down to hard-pan, and would be still safer with a turn in of 18 inches at the bottom, although a line of flat stones laid with the fence, inside, is usually enough to prevent any digging out. At the top it should have an overhang of 18 inches. This is simply the ordinary mesh wire supported on crosspieces nailed to the posts.

The outer lane is 15 feet wide, that is, wide enough for a wagon, but it can be reduced to barrow width, if space is an object. In each of two corners is a kennel for a watch Dog that patrols the lane; for among the plagues of the fox-farmer are the sneak thief and the malicious neighbour, who might open the gate by night and thus cause the loss of all the stock. At each of the other corners is a long refuge box with a 5 by 9-inch hole at each end. In these any Fox getting out of his pen will take refuge from the Dog and remain till put back where he belongs.

The small cages are designed each for a breeding female. If more than 5 were on hand, these cages might be halved without serious cramping. All their doors are 2 by 4 feet, and open on the central alley. Their sill sides should be raised a foot to allow for snow.

In each, at its driest point, a hole about 3 feet wide and 2 feet deep

should be dug and roofed over with something to turn the rain. A 9-inch hole, angling down to this at one side, completes the den. In the Norton yards these dens were shingled, as it is very important to have the nursery well drained and dry. No lining is needed. The mother Fox can add it at will, or leave it out, as she mostly does.

The large cages are loose ranges for any or all that are not nursing mothers or very young. All open into the central lane, as an additional safeguard against escape. This lane is 4 feet wide. It is furnished with a

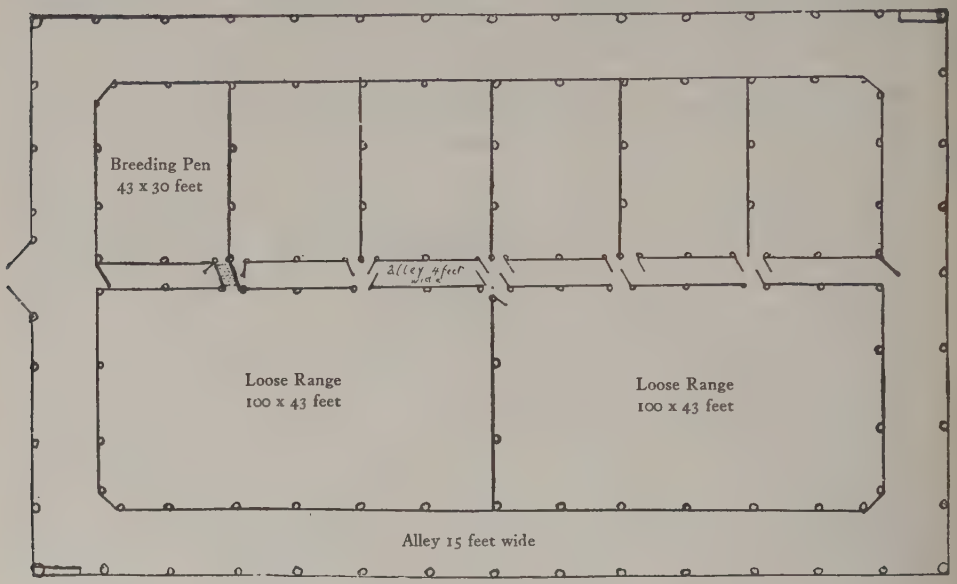

Diagram of model fox-yard

movable alley cage about $5\frac{1}{2}$ feet long by 2 feet wide and 4 high; it is made on the bias and provided with a drop door at each end. Both top and bottom should be of light boards, as sometimes one is floor, sometimes the other. This is put across the lane from door to door when it is intended to change an animal from one cage to another. At left, in the diagram above, it is shown in position to allow of the Fox being driven from the pen. By this means a Fox can be transferred from any one pen to any other without handling.

How to Feed Them

Most beginners will ask themselves—or other competent authority—what does the Fox feed on in a state of nature, and then decide that that is his proper food in captivity. Curiously, and happily, this decision is not backed by experience. Those who feed the Foxes on fat pullets, Rabbits,

PLATE CXX.—A FUR FARMER AND ONE OF HIS BREEDERS

PLATE CXXI.—YOUNG AT MEAL TIME
Foxes on fur farm
From photographs by E. T. Seton

TEN FEET FROM THE GROUND

FORCING A MESH

CLIMBING UPRIGHT WIRE

IN THE YARD

PLATE CXXII.—YOUNG FOXES ON FUR FARM

To illustrate especially the climbing propensities of the young

From photographs by E. T. Seton

and Mice will soon find their charges a lot of worm-eaten dyspeptics. A much better answer is given by Norton and endorsed by Stevens, "Feed your Foxes the same as your Dogs." Bread, table scraps, and a very little meat, is their diet on the farms. Norton feeds butcher's scraps, offal of animals, and in the winter he often gives them the flesh of a Horse, taking great care that it be not one that died of disease.

Stevens feeds his chiefly a cake made of the following recipe: One quart sour milk, 1½ teaspoons of soda, enough corn meal or "Daisy flour" to make it stiff, spread half an inch thick on pans, and bake. No sugar, salt, or eggs are needed. This will keep for two weeks, and is eagerly eaten by the Foxes. The young ones that I saw came running and shouldering like a lot of little pigs to get at it in the trough when the evening meal was announced by a familiar whistle. A piece 2 by 3 inches makes a meal, and they get two meals a day—morning and night. Each Fox also gets daily a pint of skim milk, and once a week about half a pound of raw meat. They are extremely partial to Woodchuck. One fat Woodchuck is enough to make a week's allowance for eight Foxes.

Norton occasionally shoots a crow and throws it in. The Foxes do not touch it for two or three days; then, as it gets gamy, they devour it with relish. Neither farmer has tried dog-biscuits. If a Fox secures more food than he can eat, he buries it till he is hungry, keeping a watch on the place lest any fellow captive should steal his hoard.

Stevens has been in the business for two years; he has 20 or 30 Foxes, and reports none lost at any time by disease.

Norton has had five years' experience; he carries 30 to 40 Foxes, and reports that one or two die each year from a disease that affects the head. It causes a running of the nose and fills the ears with scab. A careful comparison of their systems of diet shows that the Norton Foxes get more meat than the Stevens Foxes.

Breeding in Pens

In a state of nature the Fox is a monogamous animal; is believed to pair for life. In captivity the breeders encourage polygamy, letting one very choice male serve several females. The embarrassingly high moral standard of the Fox is one of the difficulties of the breeder, but there is good reason to believe that human care and influence will undermine their awkward scruples exactly as with the Dog and other animals that have submitted to domestic life. I am told, on the other hand, that polyandry is bad. If a breeding female is allowed to join with two males in the same season, the result is said to be sterility. I do not know what this is grounded on.

Over-fat animals do not breed. It is a great mistake to over-feed. In this we probably find one reason for the infecundity of Foxes in most menageries. An ordinary Fox weighs 8 or 9 pounds. The largest and fattest Norton ever had was 16¾ pounds. The breeders should be kept down to about 10 pounds. Stevens claims that of those that mate in his yard half are fertile; Norton claims only one third. As also noted, Stevens feeds them less, but something may also be due to the fact that the Stevens farm is on a quiet hillside in the country, while the Norton farm is in the busy town of Dover.

The wild Foxes mate in late January or early February, the captives are four or five weeks later. When the time comes, the female utters her peculiar squeal and the male answers with a deeper, coarser bark. Both show a restlessness and a good deal of excitement.

The period of gestation is 51 days without 12 hours' variation; of this I am assured by both breeders.

The wild dog-Fox is a model father and faithfully helps to provide for the young, but in captivity he is not needed, and it is best to keep the mother in the breeding pen by herself. The quieter she is the better. The young should not be approached, much less handled. Strangers should be forbidden the range till the young are able to run. If disturbed or frightened the mother is liable to carry the young about in her mouth, seeking a safer place for them, till they are worried to death.

The young number from 3 to 9; 6 or 7 are the usual litter. They are born blind; their eyes open about the seventh or eighth day. When they are a month old they begin to come out and play together like kittens. They are now considered past the critical period. They begin to eat solid food, and, when three months old, the mother weans them, and they may be taken away. At midsummer they are half grown, by winter apparently full grown, and in the following February or March, while yet less than a year old, they also breed. The young are much wilder than the old ones at first, but good management soon convinces them that all their fears are ill-founded, and they soon get tame and gentle.

Foxes are much less quarrelsome than most carnivores. Norton has lost only 2 through fighting. Both were killed by an abnormally vicious old dog-Fox that bullied the others. Such instances are rare, and a Fox of that temper should be considered a freak and not allowed to breed.

Every effort should be made to "gentle" the Foxes. First, by selecting the most docile to breed from; second, by giving them no cause for alarm.

Cleanliness is of the utmost importance. Clean drinking water and clean pens are essential. The Foxes are naturally clean. They do not bury

their dung with cat-like scrupulousness, but they leave it at one end of the run. Stevens's pens, though smaller, have escaped all diseases because, he says, each year he digs over the soil to sweeten it. The pens must have shady places and sunny places for the varying weather. It is well also to caution the beginners against giving the Foxes a pile of new earth to dig in. This is sure to cave in and cause trouble.

Fur is prime in November, but should be left until late December, as it continues to get fuller, and the fading process does not set in until the end of winter. The fur is improved by cold weather and by plenty of food in the fall, especially oily foods, such as fish heads, etc., and oil cake might prove effectual. Castration, to make a larger, finer robe, has not been tried.

Cost of Stock

In getting stock the fox-farmer must remember that the farther north it comes from the better, and that the Gray-fox of Virginia and the South is not wanted at any price. The best way to get Foxes is by digging out the young in May and June.

Wild Red-foxes can often be bought for one or two dollars each. The breeder gets $8 to $15 a pair for good cage-reared seasoned specimens of the common Red-fox. But we wish to raise Silver Foxes, not common Reds. As already stated, the Silver, Black, and Cross-foxes are mere colour freaks of the Red-fox. They are found wild in every shade and inter-grade. The ideal and inimitable Silver Fox is glossy jet-black with a sprinkling of silver on the long hairs, giving a frosted finish of exquisite beauty. A pair of Silver Foxes may produce a litter of Red-fox young. But these things run in families and a pair of Silvers or Blacks are almost sure to produce some of their own colour. By selecting the dark ones for breeding, the desired type can soon be fixed. In five generations, that is, five years, Norton tells me he found it possible to breed out all the Red and have a strain of pure Silver Foxes. From a pair of fairly good Blacks, valued at $50 each as pelts, he last year raised 7 perfect Silvers worth $200 each.

Profit

There are two sources of profit to the fur-breeder. First, the sale of fur; apparently this is his only one. The Winnipeg *Commercial* gives the following quotations for Fox pelts, March, 1904:

Prime Common Red	. .	$ 1.50	to	$ 4.00
" Cross	. . . .	5.00	"	15.00
" Silvers	. . . .	50.00	"	200.00

These may be considered as conservative figures. W. F. Sheard, the fur-dealer at Tacoma, tells me that he once sold three perfectly matched Silver Foxes for $1,200. A man, therefore, with an acre of ground "under Foxes" might raise 20 to 40 Silvers a year with an average market value of $150 each, *i. e.*, $3,000 to $6,000 a year gross, and the expenses would be very low.

How long the price would keep up to this high figure it is impossible to say, but it has kept up for over a hundred years and there is no present sign of decline; rather the contrary.

My own impression is that twenty years from now there will be a great many fur-farmers furnishing first-class Silver Foxes, more than ever before were put on the market. This will eventually lower the prices, but it will be largely offset by the increasing market, and it is safe to say that so beautiful a fur will always fetch a figure sufficient to make it remunerative to produce.

The second profit of the dealer, and perhaps his best, is the sale of his fine stock to other breeders. A Fox whose pelt is valued at $100 is worth $300 as a breeder. Messrs. Norton and Stevens hold their breeders at: Reds, $15 per pair; Cross, $75 per pair; Silvers, $300 to $400 per pair, and even at that figure they tell me that they cannot keep pace with the demand. This would naturally decrease, but to judge from experience in other fine stock it is more permanent than it would seem. It will probably last quite long enough to enable the prudent to gather a very handsome return and perhaps a comfortable fortune.

From this we can see that the Fox-breeding does not differ essentially from the breeding of any other high-class stock. Judgment, economy, cleanliness, and thrift will make it a success. I am satisfied that any man who has made a success of hens can make a success of Foxes, with this advantage for the latter—a Fox requires no more space or care than a hen, but is worth twenty times as much, so gives a chance for returns twenty times as great.

My prophecies of twenty years ago have more than come true. Fur-farming has grown to be a national industry.

For those who wish to go into it, or study it seriously, the following books are recommended:

Silver Fox Farming, by F. G. Ashbrook. U. S. Dept. Agri., Bull. No. 1151. Pub. June 20, 1923; 60 pp., many ills.; 15 cents per copy.

Fur Farming in Canada, by J. Walter Jones, Comm. of Conservation,

Canada. Ottawa, 1914; 8vo, 278 pp., many ills.; treating all kinds of animals ranched for fur in Canada.

Fur Seals and Other Life of the Pribilof Islands, Alaska, in 1914, by W. H. Osgood, E. A. Preble, and G. H. Parker. Bull. Bur. Fisheries, Doc. No. 820. June 19, 1915; 172 pp., many ills. and maps. Blue-fox Ranching, by E. A. Preble, pp. 105–116.

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